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DOUGLAS ADAMS: The Don't-Panic Mac

Microsoft Excel and Word now with built-in mail support.

If you're using Microsoft® Excel or Word, it's now possible for your entire department to work together without having a get-together.

Just add Microsoft Mail.

Doing so will add years to the life of your company's carpet. And, perhaps more importantly, allow you to accomplish tasks that were previously impossible with *any* E-mail system.

Suppose, for instance, that you're preparing a report in Word. Because it features built-in Mail support, you can zap the report throughout your entire workgroup via Mail. Without ever leaving your program.

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Now if you think that's whiz-bang, get this: When you combine Microsoft Excel with Mail, you can do much more than share spreadsheets. Thanks to Microsoft Excel's built-in macro language, you can do things like write your own macro to receive, process, and fulfill orders. All

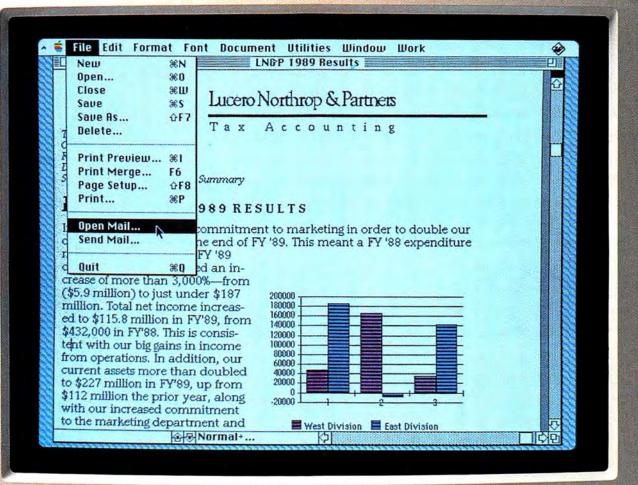
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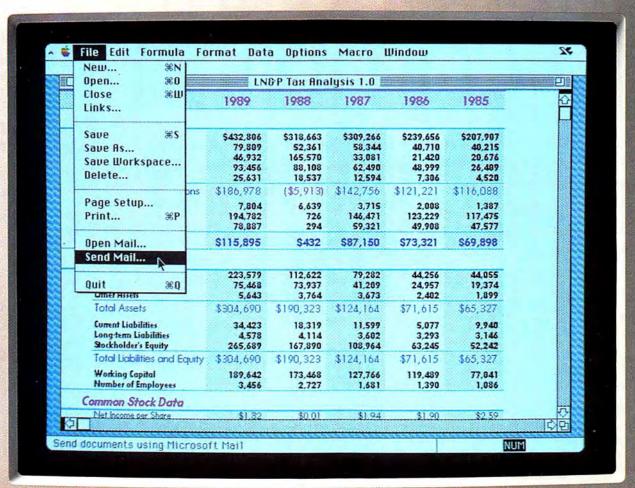
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Now that we've covered a few of the unique ways that Microsoft Excel, Word and Mail work together, we'd like to add one more point. We design all of our applications with one goal: To continually exploit the Macintosh's capabilities in ways that profoundly promote productivity. And, of course, keep users attached to their chairs.

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Microsoft announces an end to the second most common husiness trip.



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The quality and fidelity of your Mac's display are never more important than when you're working with color. As color desktop publishing becomes a reality, the choice of a color display system becomes one of the most critical elements in the DTP process.

MacUser Labs evaluated sharpness and color quality on 18 display systems to help you select the right system for your color needs.

Color on the PageBuyer's Guide 56

BY PHILLIP ROBINSON AND THE MACUSER LABS STAFF

A year ago, color printing was a novelty. Today you can choose from more than two dozen color printers at prices ranging from \$1,500 to \$75,000. MacUser Labs spent more than 1,000 hours testing the full spectrum of color printers — evaluating everything from printing speed to image quality. The results, along with some subjective evaluations from a panel of artistic experts, separate the the crayon scribblers from the polished painters.

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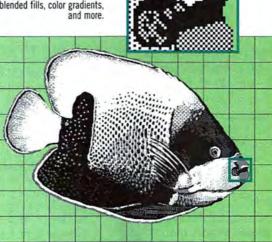
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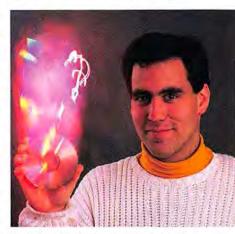
MacUser

Bright Lights, Big CD

any MacUser readers find the advertisements almost as interesting as the articles. But this month and last, one ad in particular makes an offer that's pretty hard to top. Apple Computer is giving away a special CD-ROM disc to any MacUser reader who wants it. The disc contains technical-support

documents previously available only to Apple dealers, developers, and the press. Quite a deal.

But look again, and you'll discover that the deal gets even better, because MacUser also had a hand in developing the disc. We've taken our popular MiniFinders section and transformed it into a convenient Hyper-Card stack. This stack represents our first big step into the bright lights of electronic publishing.



Technical illustrator and HyperCard programmer Mark Sweeney

The MiniFinders stack was designed and scripted in-house by HyperCard programmer Mark Sweeney, who usually hangs his mouse in the art department. Mark used some of the scripts from the excellent developers' package 101 Scripts and Buttons for HyperCard (from Individual Software) to construct the stack.

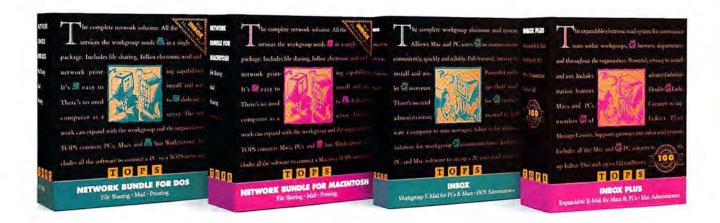
We think this MiniFinders stack is a logical starting point for our own push into digital media, and we don't intend to stop there. As we develop future versions of this stack, we expect this electronic buyer's guide to evolve into an expert system that you can use to painlessly make buying decisions. Browse through the electronic MiniFinders, and let us know what you think.

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Although Apple's CD-ROM disc is the fastest way to get our MiniFinders stack, it's not the only way. The stack is immediately available in the MacUser Download Area of CompuServe, and you can copy it for free. Just log on to CompuServe, type GO MACUSER, and follow the prompts. This Download Area is the predecessor to what will blossom into a full-fledged online service in the coming months.

MacUser is a magazine — but what's a magazine? In our case, the definition now includes digital media such as the Apple CD-ROM's MiniFinders stack. We're sure that it will continue to expand as we discover other innovative ways to deliver the information you need.

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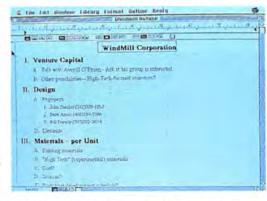
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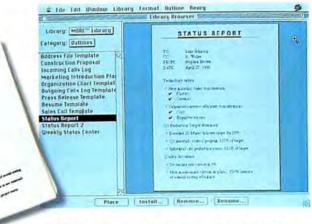
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Hard Lessons

Wow! "101 Hard Drives" (February '90) is the answer to my prayers as an objective comparison to help me translate the Babel of hard-disk ads and manufacturing claims. Congratulations on a difficult job superbly done!

Kalon Ho Breckline, MA

By your own specs, the LaCie Cirrus drives are at the top of the pack in raw speed, best real-world performance, coolest temperature, least noise, and longest warranty. Yet you gave them only 4.5 mice, complained that their case had an odd design, and ignored them altogether when listing your Bottom Line picks.

Dr. David J. Hibler Lincoln, NE

Out of 101 drives, the LaCie Cirrus 84 was 1 of only 18 chosen for the spotlight — 4.5 mice should be cause for celebration, not dismay. Mice rat-

ings were based on software quality and ease of use, hardware design and construction quality, and performance. Although LaCie's drives had top-notch performance, they lost points for hardware shortcomings and nonintuitive software, including internal termination, software-controlled SCSI-ID selection, nonstandard 25-pin SCSI connectors, and missing activity and power indicators. — JP

How could you list the Apple Hard Disk 80SC as a top pick? You had retail drives that beat it in raw speed, realworld performance, and noise. You neglected the issue of Apple's 90-day warranty and didn't mention the problems with Quantum drives.

Paul Chance Huntington Beach, CA

What makes the Apple drive so commendable or, rather, recommendable?



From "frozen land of world's oldest surviving parliament (seven letters)," H. Asgrimsson inquires whether "anyone in inventive America has come up with a foot-driven mouse? I remember a product called DataGlove. How ahout a Data-Sock?" No, but we hear that the Nintendo Company (of evenmore-inventive Japan) is considering a PowerSock. Perhaps the technology will trickle down — or up.

Mr. Asgrimsson goes on to say, "Keep Dvorak, he's the main reason I buy MacUser!" We don't know who leaked word to Iceland that John had been replaced, but don't fret. We coaxed him back after crossword puzzler Nhoj C. Karovd quit in a fit of "homonym for sneaky glance (five letters)." For the solution to Nhoj's puzzle, see the end of this month's letters

Manufacturing excellence, which ensures durability. This attention to detail includes a steel chassis liner, the most cleanly assembled power supply (made by Sony) we've seen, and time-proven drive mechanisms from Quantum and Seagate. The Quantum mechanism that caused problems in Apple's internal hard drives was the ProDrive80S, which isn't used in the external drives. — JP

Broken English

Your review of Sensible Grammar in "The Complete Guide to Word Processing" (February '90) was interesting. But even more interesting was the sample screen, which instructs users to make a terrible grammatical error. The screen suggests that "if the scripting language weren't" should be replaced by "if the scripting language wasn't." The explanation is that the singular subject should take a singular verb.

Sensible Grammar has applied the wrong rule! The conditional construction in English takes the subjunctive mood.

Pat O'Neil Tempe, AZ

We chose that screen on purpose (really!) because, to paraphrase the alien commander in the movie Plan 9 from Outer Space, grammar programs are stupid, stupid, stupid! They're totally unable to identify context. That's why they're useful only to nitpickers such as you who are secure enough to overrule them when they step out of bounds. — JB

In the Swim

To the people who complained about the November '89 cover: Lighten up! I guess the days of the Mac being fun and a tool are gone. These complainers probably own an IBM, gripe about game reviews, and kiss only on the cheek.

Patrick Madigan Milton, MA

Suppose the woman in the pool portrayed a successful novelist or columnist? Isn't the Macintosh Portable supposed to free us from the postindustrial office environment?

Gary Stewart Houston, TX

Even Steven

We commend Steven Bobker for his concise and accurate review of our program HyperHIT in Bobker's Dozen (January '90) but would like to make a clarification. He stated, "As with all

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ILLUSTRATION DAVID COULSON



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We like to think of CanOpener as the information retrieval utility for the Mac. Because it lets you search and retrieve text, pictures and sounds from just about any Macintosh

file; then view, save, print or copy the information you need.

But it seems our users have other ways of describing CanOpener, such as "..useful", "..a lifesaver" or (our current favorite) "..the neatest thing since peanut butter!"

And some of the toughest critics of all, the editors of MacUser magazine, recently awarded CanOpener their prestigious Editors' Choice Award for Best File-Management Utility.

So, no matter how we describe CanOpener, one thing is clear, it's solving our customers' information retrieval problems. And in our opinion that makes CanOpener just one thing ... a success!

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ABBOTTSYSTEMS

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LETTERS

HyperCard applications, databases created in HyperHIT are slow." In fact, one main advantage of using HyperHIT with HyperCard is that data retrieval is much faster than when using HyperCard alone. In many cases, the search time is reduced to under half a second.

Dorothy A. D'Attoma, President SoftStream International Mount Laurel, NJ

Dearly though I love Steve Bobker's Dozen, I must point out that his review of Ceres Software's Inspiration (December '89) missed the point. After stating that "Inspiration bills itself as a thought processor," Steve proceeds to review it as an outliner. True, a thought processor has outlining capabilities, but it's much, much more than an outliner.

You'll do your readers a service if you'll run another review of this product, treating it as a thought processor. For many of them, your review will make them aware of hitherto unsuspected potentials, both in themselves and in their Macintoshes — something I believe

MacUser does uniquely well.

T. F. Carney Windsor, Ontario Canada

You're not alone—a lot of people out there really like Inspiration. I'm not convinced by all I've heard, but I think another look is in order. I'm getting the latest version, and I plan to review it again in an upcoming column.—SB

I was happy to see such a favorable review of HandOff in Bobker's Dozen (February '90). Mr. Bobker's only complaint was that HandOff does not support Apple's Desktop Manager. He'll be pleased to know that a new version of HandOff that does support the Desktop Manager is already in beta test and should be released soon.

Fred Hollander, President Software Innovations, Inc. Allen, TX

Small Is Beautiful

I applaud Paul Somerson's pledge to champion products from companies of



Special Delivery. . .

 With all the bashing of Apple's authorized dealer network that's been going

on around here, let's turn over the mailroom floor to an actual authorized dealer:
Brent Flanders of MacSource, Overland,
Kansas. "We worked very hard to become
Apple-authorized because of the benefits,"
he writes, "and not to be labeled as 'not
having our act together.' So, if you have
any question or problems your local Apple
dealer can't handle (and we believe there
are some good Apple dealers!), we'd be
happy to do our best to solve them at (913)
383-3111." Let us know how they do.

After building his own Mac II out of an IBM-clone Tower case (\$500) and \$3,000 worth of "over-the-counter, no-questions-asked, I-know-nothing, I-see-nothing" parts from his local Apple dealer, Walter Cooke of Kingston, Ontario, Canada, found he still missed the Apple label. His solution? "I stuck the plastic 'Macintosh' plate I'd saved from the back of my old 128K Mac on the front of my Mac II Tower case."

Everyone seems to agree that Apple should make **System 7 compatible with Adobe Type Manager**, and Andy Baird of Hightstown, New Jersey, spoke for most when he wrote, "Apple is going to have to face an unpleasant reality: We users don't need Royal. We don't want Royal. What we want is a standard, and that standard is PostScript. Adobe was there firstest with the mostest." Others, like Lee Lettow of Cincinnati, Ohio, see it as a customer-relations issue: "If Apple gets greedy and follows the earlier path of IBM by trying to shackle users, it will lose its place to a more enlightened competitor."

This month we feature a celebrity question poser, ON Technology's Mitch Kapor. (Remember him? He changed the curricula of MBA courses across the nation with a product called 1-2-3). Mitch's observation: One of the toughest things about developing On Location, his company's new DA for file management, was resolving seemingly endless conflicts with other DAs, INITs, and cdevs.

Speak Up:

How can Apple end cdev/INIT conflicts once and for all?

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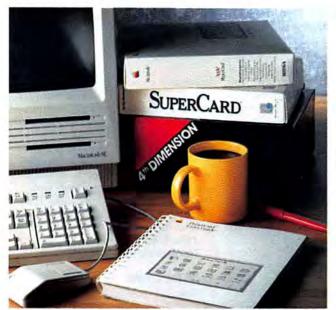
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LETTERS

all sizes ("The Best of Everything," December '89). Some of the Mac programs that have thrilled me most have been inexpensive gems from small companies. For example, I honestly believe that I do more writing in Symmetry's Acta than I do in any other program.

Daniel P. B. Smith Norwood, MA

Electrical Charges

"Unsafe at Any Frequency?" by Winn L. Rosch (February '90) was generally useful and equable as regards exposure to radiation, but the article confused the effects of the relatively pure 60-hertz waves coming from power lines with the broader spectrum of radiation coming from the flyback transformers of CRTs. Power-line radiation has been implicated in cell cancer and cell studies, while CRTs have mainly been studied in terms of eyestrain, headaches, and an increased number of miscarriages among female users. This latter effect wasn't mentioned in your article.

Larry Rapoport Los Angeles, CA

Off-Color Words

We appreciate your including New Horizons' WordMaker in "The Complete Guide to Word Processing" (February '90). Unfortunately, there are two omissions in your features-comparison chart. WordMaker does support color text, and it also allows you to input color graphics — including 32-bit-color graphics.

Brian N. Sarrazin, Vice President New Horizons Software, Inc. Austin, TX

If you were going to test a 250-mph rail dragster, you wouldn't fill its fuel tank with used crankcase oil, run it on a go-cart track, and then whine about its handling and lack of speed. Yet Charles Spezzano tries to run FullWrite Professional, which he admits is "for power users... people preparing complex documents," on his SE and complains that it can't handle his 50-page document. I've run FullWrite on a Mac II with 5 megabytes of RAM and a 90-megabyte hard drive for over a year, and it has worked fast and flawlessly.

Tony Hyman Claremont, CA

Tape Backup Stays Down

In your recent review of tape drives

(December '89), you recommended Mac-Products MagicTape 60 tape drive as an inexpensive but effective backup system. Upon receiving mine and hooking it up, I discovered that my SE with a 20-megabyte internal drive wouldn't boot with the tape drive hooked up to the SCSI port, regardless of whether the MagicTape 60 was on or off. The unit works only if I hook it up after the SE is booted, but I must unhook it again after I turn it off, in order to boot up again.

I called MacProducts' technical support and was told that this had happened to a "few other people" and that "there is nothing that can be done." This is quite irritating, and if I weren't so cheap, I'd send it back, but I'm hoping that if enough people complain, it will be fixed.

Michael Marion Tupelo, MS

It's All Relative

I commend you for your informative and evenhanded review of Double Helix 3.0 in the February '90 issue. However, you're wrong in saying that data relation is "Odesta's idiosyncratic term for a data file." Actually, relation is the correct term; it is data file that is idiosyncratic.

The relational data model was defined by Dr. E.F. Codd in 1970. The only data structure allowed is a two-dimensional table. Dr. Codd is a mathematician, and the name for a two-dimensional table in mathematical set theory is *relation*. It is from that concept that relational databases get their name; A relational database is nothing more than a collection of relations.

Dr. Jan L. Harrington Poughkeepsie, NY

Regarding your review of 4th Dimension (February '90), I'd love to see a 4D database program with 25 different files, 12 open simultaneously, with a total record count of more than 30,000 40-plusfield entries do an efficient (fast) search. Blyth Software has been around since almost day 1. I've hung in with them through thick and thin, and they have always come through with flying colors. Their Omnis 5 is the fastest and most reliable database around.

James D. Bakken Two Harbors, MN

Hit the C Spot

First, it's how to hack your system with ResEdit, and now you're running a



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1 For those already familiar with the ever popular Stufflt," Stufflt Deluxe adds over 75 new features, including complete archive management (sorting, multiple windows, Pinder life operation, etc.), improved password protection, variable compression methods, scripting virus detection, and one-step QuickStuffQuickUnStuff menus. Added homes: Two Viewit." brand viewers. Call us for more info.

2 For the record, Raymord Lau, the modern-day inventor of Stufflt Deluxe, is alive and well and believed living somewhere on the East Coast.

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LETTERS

series on programming in C ("Get with the Program," February '90)? If you keep this up, this subscriber will renew for the rest of his life!

Matthew Strange Mansfield, PA

But how old are you? - JB

I can't tell you how excited I became when I saw the inaugural column on programming (February '90)!

There's always been an enormous gap in programming information for the masses between articles on HyperCard scripts and the hard-core programming journals. I look forward to MacUser's filling it.

Chip Zempel Fair Oaks, CA

The decision to begin a programming column covering the Mac Toolbox, much less using THINK C to do it, is just outstanding. Who knows what this could do for the Mac community? My hat's off to MacUser.

Mark Grozde Mt. Clemens, Mi

The argument about the advantages and disadvantages of C and Pascal could go on forever. I just want to bring up three points. First, most people find Pascal much easier to read and to later modify. Second, most examples in *Inside Macintosh* and in technical publications from Apple are written in Pascal. Finally, there are "full-featured" versions of Pascal such as THINK Pascal that have the added advantage of interpretation.

These are more than negligible considerations to keep in mind when writing a column purporting to teach Macintosh programming.

Philip N. Hooge Carmel Valley, CA

His Font-Test Wish

I found "Fonts from A to Z" (September '89) and "Font Woes" (January '90) collectively to be the most comprehensive lesson so far on typefaces. Still, one question continues to block my way toward achieving the clean, logical organization and efficiency taught by these articles.

Is there any function to be found anywhere that in any way provides information about a selected font's type (Post-Script or bit-mapped), its makers, and any other valuable information? I'm thinking of something that works in much the same way that the Finders' Get Info command does.

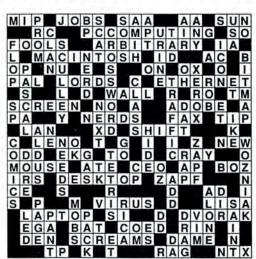
Steve Aronstein Amherst, MA

Sorry, we don't know of such a program, but if you start following Matthies and Hogan's Power Programming column, perhaps you can be the one to write it. — JB

Dvorak Shreds

John Dvorak, dare I say it, is right on target again. "The Nine Magic Keys to Success" (February '90) is his finest piece of hard-core truth.

Keep tearing 'em apart. David W. Buckner Las Vegas, NV

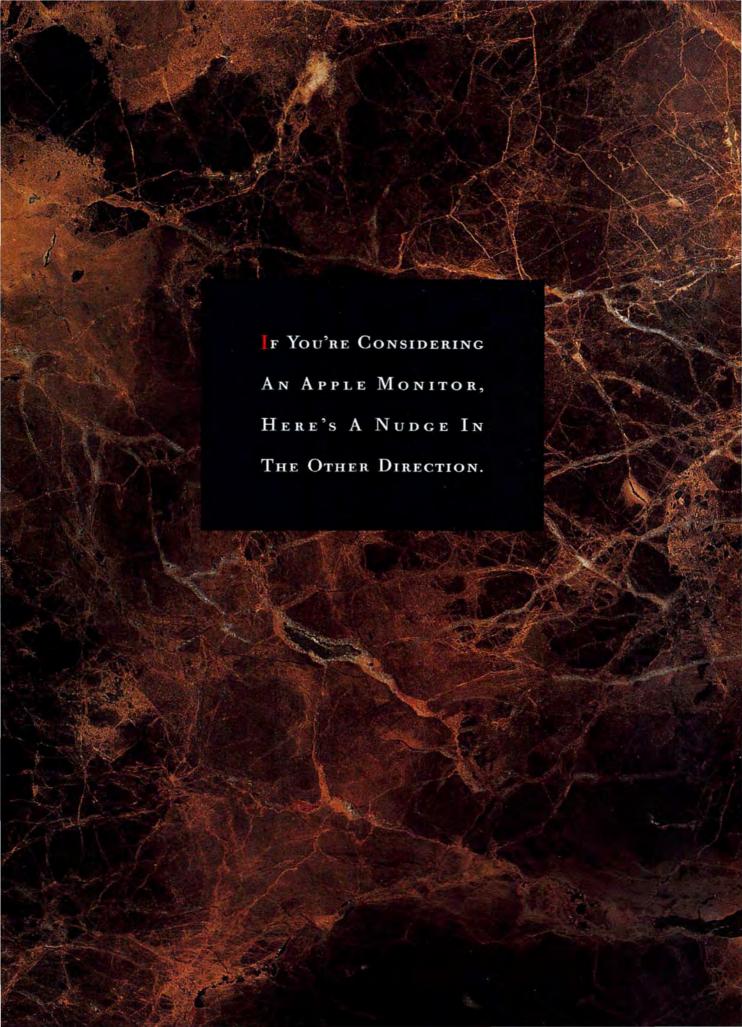


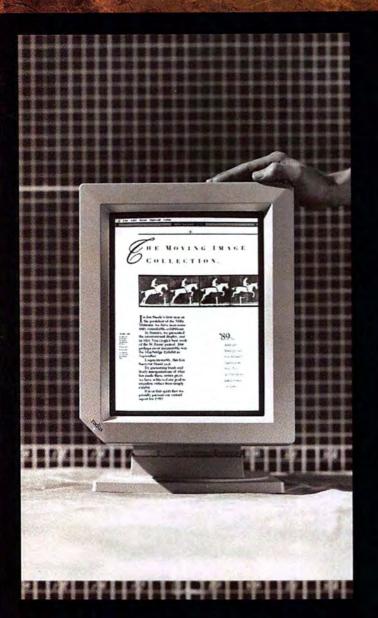
Solution to last month's puzzle

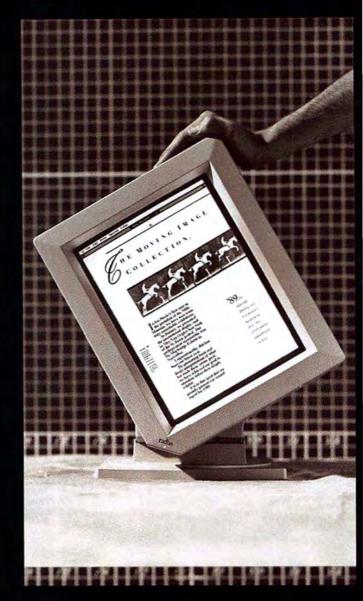
CLARIFICATIONS

The legend of the "File-Duplication Performance" chart in the "SCSI Accelerators" Labs Brief (March '90) was reversed. The top, light-green bars represent the performance times we recorded when duplicating four files of 1.6 megabytes each. The lower, blue bars represent performance with 200 files of 10K each.

4 files of 1.6MB each



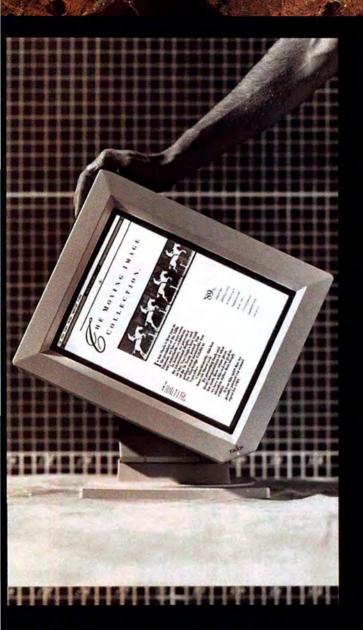


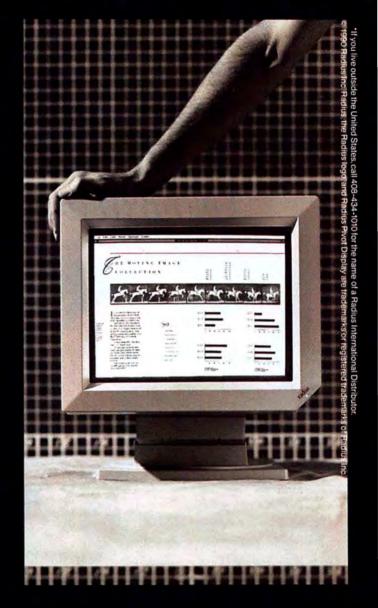


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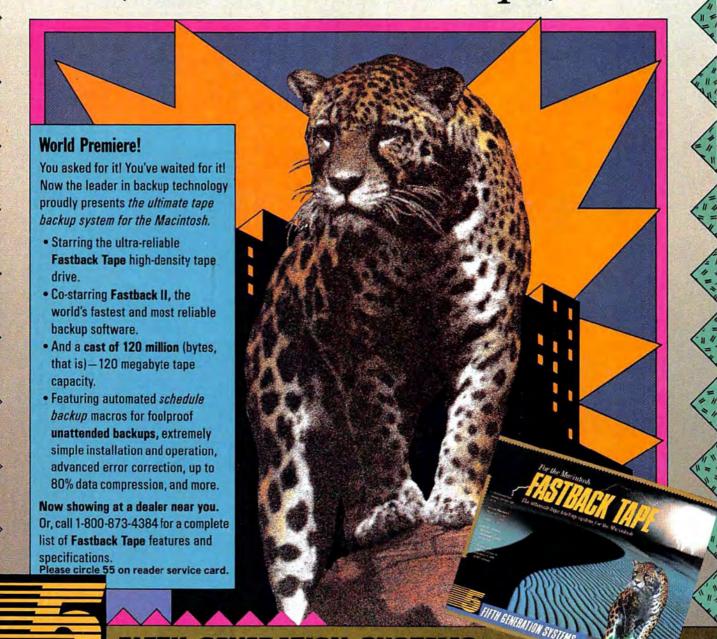
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FAST BACK: BY POPULAR DEMAND

(Now available on tape.)



here hasn't been this much fuss about a delivery system since somebody sued Domino's Pizza for driving too fast.

In many ways optical storage promises to

In many ways, optical storage promises to shake things up almost as much as the original microcomputer did — at least until this country gets wired for ISDN (but don't hold your breath).

If you're skeptical, you're not alone. The number of Mac owners who have bought CD-ROM drives is in the very low ten thousands. Last issue, when *MacUser* reviewed every CD-ROM product on the Mac market, we could locate only 38. And Microsoft's recent Fifth Annual CD-ROM Conference attracted fewer than 100 exhibitors. Apple needs to sell its CD-ROM players for even less than its recently reduced \$899 price, develop a speedy CD-ROM jukebox, and bless a large-format

lookup engine that boasts Booleans. Using HyperCard for the Symphony) and Warner New Media (with CD Audio Notes: The Magic Flute) have produced a pair of riveting packages that play digital-audio sound while providing inter-

active commentary and music lore.

Mediagenic's Cosmic Osmo is a spellbinding slice of pure technology, a masterful 3-D fantasy romp that enchants both children and their parents, a USDA-safe tab of digital acid that makes you sorry Lewis Carroll was born a century and a half before the Mac. Even in its pedestrian small-screen black-and-white HyperCard haberdashery, it hints at astonishing things to come.

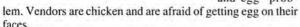
PAUL

Similarly, Datapro's pricey but ground-breaking Consultant CD-ROM suggests what periodicals might resemble a few years from now. It's like having a consultant slide into your seat and demonstrate the strengths and weaknesses of competing products in real time, while narrating the process. Parts of

Free and Easy



Why hasn't the optical market exploded? Why don't more people own CD-ROM players? Why haven't developers come up with more titles? It's the classic chickenand-egg prob-



Exercise 1: Stop and think how things would be different if every Mac had come with a CD-ROM player built in and if Apple had provided a smart, muscular, effortless search tool.

Before you answer, look at some of the sizzling things vendors are now doing with CD-ROM discs. Then contemplate what they could be doing in the future:

Apple saved four million bucks by distributing its tech documentation on CD-ROM discs and now lets its field staff have on-the-spot access to the entire Apple resource library.

Microsoft has combined four of its Mac apps with animated tutorials, easily searchable documentation, and a hefty collection of utilities on a CD-ROM disc. SuperMac, Farallon, and Letraset have also recently jumped on this "application environment" bandwagon. It's software that jump-starts — no juggling floppies during installation, lots of on-line assistance, and all the tools and samples you need in one place. One thing that has made the Mac great is ease of training. CD-ROM can make it even easier.

Voyager (with its CD Companion Series: Beethoven's Ninth

Consultant are a real knockout. We at *MacUser* do real testing in a real lab. (We're the only ones who really do.) We wish we could re-create the tests for you while you watched. With a CD-ROM, we could.

(Exercise 2: Drop in on the offices of all the Mac monthlies. Ask to see the labs. At MacUser you'll have to specify whether you want to visit the busy product-testing lab; or one of the two equipment-packed lab annexes; or the new MacUser Labs connectivity NetWorkShop, with its dozens of Macs. If you visit any office other than MacUser's, practice saying incredulously, "That's it? But where's the real lab?" Try it.)

Someone at Highlighted Data is either very smart or very prescient. Its Webster's Ninth New Collegiate Dictionary CD-ROM is not only the most complete Mac lexicon available, but it also offers something wonderful: correct, digitally recorded pronunciations of every word. You'll never again have to deal with macrons and breves and schwas. You just click and listen and learn. You can also cut and paste the illustrations or bump up the font to a large-print 24-point size. Highlighted Data has to iron out a few performance wrinkles but should be commended for its foresight. This is value-added at its best.

Want more? Bowker, the librarian's best friend, offers more than a million book citations and more than 70,000 full-text

book reviews. Or snap up Broderbund's CD-ROM Whole Earth Catalog, a random-access treasure. Or Grolier's Electronic Encyclopedia. Optical Media's Universe of Sounds. Uni-Disc's Guinness Disc of Records. Wayzata's CIAspook World Factbook. Xiphias' Time Table of Science & Invention. There's even a disc of "photographic erotica" from Sola in Milan.

t's the classic chicken-and-egg problem. Vendors are chicken and are afraid of getting egg on their faces.



BY PAUL SOMERSON

But think about what CD-ROM will offer in the future. You can produce your own for a lot less than you imagine. These days it costs a mere \$500 to \$1,000 to master a CD-ROM and just \$2 or so for each copy. You can even have Apple put

one together for you; they'll handle the mastering and duplication and hand you 100 discs in as little as five days for \$1,500 (for details, contact Apple CD-ROM guru Eileen Hart).

And think of things to come. Do you

ever do slide shows? Wouldn't you like to have a huge library of slides at your fingertips and be able to scan through and select individual ones that suit your pitch that particular day and then click and print them instantly on a nearby film recorder for a custom presentation?

DMERSO Or distribute your company's software in a cheap, durable, virus-safe form? Or archive and distribute your company's data to branch offices effortlessly and cost-effectively? Or sell software packed with help and utilities and added value, and even ads and graphics/sound demos for your other products? Or distribute Mac and IBM software on the same disc? Or use full-motion video or animation to

illustrate real-world events? Consider how

much easier it is to demonstrate "clock-

wise" by showing hands that move instead of describing it in words.

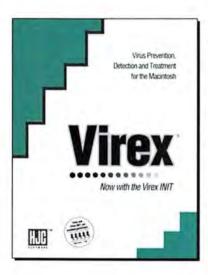
Philips' CD-I and Intel's DVI compression engines can cram more than an hour of full-motion video onto a disc. Imagine the interactive software this could allow: A tough foreign-policy tête-à-tête between you and the President. A trip to a distant country down streets you randomly decide to wander, interacting with locals. Piloting a rocket to Mars. Leading a leveraged buyout of IBM. Setting up an AIDS clinic. Taking a one-on-one management class with Machiavelli, Discussing the universe's shape with Einstein.

Exercise 3: Get an absolutely free CD-ROM, coproduced by Apple and MacUser, that you can use even if you don't yet own a CD-ROM player. (You can put it into your audio CD player and hear both Jean-Louis Gassée and our own John Dvorak talk about sexy CD-ROM technology, John also provides a tool kit of custom Dvorak Control Panel sounds.) If you do own a CD-ROM player (and you should), you'll be able to use Apple's tech-support tools and samples of third-party CD-ROM software. Plus all of MacUser's MiniFinders in a convenient, easy-to-use on-line format. It's hot. And it's free. Check it out. Get a copy for yourself today before they run out. Just call (800) 441-3001, ext. 100.

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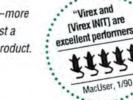
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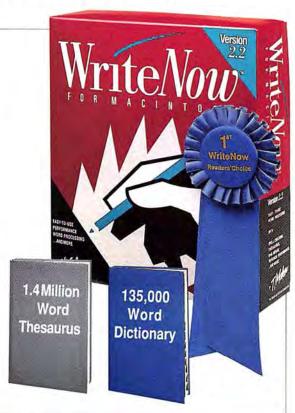
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Reviews

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[WriteNow] might be The Best Program I'd Ever Used. On any computer—it's the fastest Macintosh word processor I've ever seen. —JIM SEYMOUR, MACUSER MAGAZINE

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-PC WEEK MAGAZINE

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135,000	100,000	130,000	60,000
Yes	Yes	Yes	Yes
Yes	No	Yes	No
Yes	No	Yes	No
Yes	No	No	No
\$195	\$249.95	\$395	\$295
	(2) 800K 1.4 million 135,000 Yes Yes Yes Yes	(2) 800K Hard disk 1.4 million 220,000 135,000 100,000 Yes Yes Yes No Yes No Yes No	(2) 800K Hard disk Hard disk 1.4 million 220,000 220,000 135,000 100,000 130,000 Yes Yes Yes Yes No Yes Yes No Yes Yes No No

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REO-650



ROBERT R. WIGGINS

ou can't pick up a business magazine anymore without reading something about Japan's industrial superiority over the U.S., especially in the high-tech arena. If it's made of silicon, odds are the Japanese can make it faster, better, and cheaper — or at least that's how it seems. The failure of US Memories (the consortium of U.S. manu-

facturers that was going to wrest the DRAM business back from the Japanese) earlier this year was just another nail in the coffin of U.S. industry. And when an American firm does manage to beat the Japanese in some area, that firm is likely to end up as the feeding frenzy for stock options, company cars, golden parachutes, and other perks. Some of the best and the brightest left Apple when they found themselves spending more time fighting political battles than getting work done.

The problems extended all the way to the top, and Apple has ended up with all the problems of its old corporate culture multiplied by all the problems of the standard

corporate culture that's been grafted on top. Apple compensates its executives based on quarterly numbers. So, like countless other companies, Apple finds that its management is most interested in immediate gratification and the bottom line, whereas

Knee-Jerk Economics

a Japanese subsidiary. The cheap dollar, high capital-gains tax, heavy regulation of telecommunications, and protectionist cartels and consortia combine with the strong yen and Japan's almost nonexistent taxes on capital gains to make it cost-effective for the Japanese to simply buy American companies at bargain-basement prices. (For more on this subject, read *Microcosm: The Quantum Revolution in Economics and Technology* by George Gilder, a *Forbes* contributing editor.)

It's not just economically that the Japanese are ahead of the U.S. Japanese management is considered more forward-looking, more long-term-oriented, and more stable than U.S. management. Japanese employees are generally more loyal than their American counterparts and are usually considered employees for life. The Japanese don't job-hop as much as Americans do, nor do they live in fear of layoffs—their employer will be around to protect them their entire life.

Then there's Apple Computer. You might remember that Apple long considered itself an alternative to standard corporate America, and perhaps the hope of the future against the Japanese juggernaut. Apple's corporate culture featured consensus instead of fiat, area associates instead of secretaries, stock options instead of pension plans. In his book *Odyssey*, John Sculley described the difficulty of acclimating to Apple's ways of doing things, as well as his vision of how Apple's corporate culture might grow to encompass satellite companies rotating about the Apple mothership. A lot of people wanted to see Apple's corporate counterculture succeed and point the way for other U.S. companies to compete against the Japanese.

Unfortunately, reality intervened. The success of the Macintosh caused Apple to grow by leaps and bounds, and as Apple brought in outsiders to help the company through its growing pains, the outsiders brought with them the very culture that Apple was trying to supplant. Managers began acquiring fiefdoms and building their own little kingdoms, and many old-time Apple employees — the original true believers — found themselves steamrollered, pushed aside, or simply forgotten in

its Japanese counterparts are looking five and ten years ahead. Apple is also abnormally focused on its gross profit margin (GPM) and recently raised its target of a 52% GPM to a 55% GPM. If you've ever wondered why Macintoshes are so expen-

sive, a 55% GPM plus the dealer's margin of 35% to 38% means that most of the price of a Macintosh is markup, and this doesn't even count Sony's profit margin on the power supplies and disk drives.

This focus on the GPM even causes Apple to make some bizarre product decisions. For example, System 7.0 is going to require 2 megabytes of memory, and even today most people could use more memory, yet Apple still sells many machines with only 1 megabyte of memory because memory has a relatively low GPM, and putting the extra memory in would lower the GPM even though it would increase sales and profits overall.

Apple's fixation with quarterly numbers has had other effects. When projected profits fall, Apple's knee-jerk reaction is to look for ways to cut expenses, including canceling projects and laying off people just because they happen to be in the wrong department at the wrong time. A good deal has been made of IBM's recent program to decrease he Japanese aren't just economically ahead of the U.S., but more forward-looking, long-term oriented, and stable than U.S. management.



BY ROBERT R. WIGGINS

employment, but IBM's plan involved voluntary departures and was spread over many months. Apple just walked in with a scythe in January and started swinging.

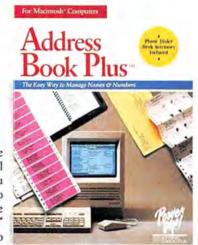
People have said that the Apple of 1990 is just like IBM. It's not - it's much

worse. IBM and Apple may suffer from some of the same short-term fixation problems, but IBM has always taken the longer view. IBM may also be reducing employment, but it is doing so with minimum disruption and no layoffs. IBM may worry about its profit margins, but it doesn't put its margins ahead of sales or profits the way Apple does. IBM may put some employees into the same kind of limbo that Apple sometimes does, but IBM has programs in place to help them find other jobs in the company. IBM may have other personnel problems, but it has never allowed the personnel function to grow into a centralized monster with a stranglehold on the company. The Apple of 1990 should wish it were just like IBM.

Apple needs to look up from the immediate quarterly results and start taking a longer view. Executives should be rewarded for their efforts to promote long-term growth as well as quarterly profits. And although it's good to have understandable goals, allowing goals such as a 55% GPM to overpower other, more rational, goals is counterproductive. When economic conditions take a turn for the worse and downsizing is inevitable, Apple should be more selective and use the ax to prune away just the deadwood, not whole branches.

Apple has a lot to be proud of in its short history, and there are undoubtedly many more milestones yet to be achieved. Perhaps Sculley's dream of an Apple mothership surrounded by successful and prospering satellites can still come true. Every time you use a Macintosh, you plainly see that miracles can happen. But Apple could use some help from a government whose economic policies favor declining industries such as steel, timber, and textiles at the expense of high-tech companies such as Apple. A stronger dollar and a reduction in the capital-gains tax would help not only Apple but every other high-technology company as well and would go a long way toward making American high-tech firms less-attractive takeover targets for the Japanese. 🖫

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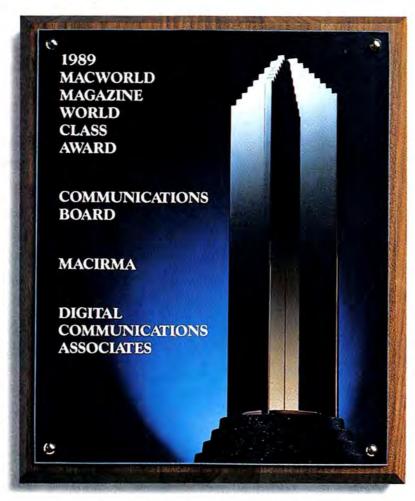
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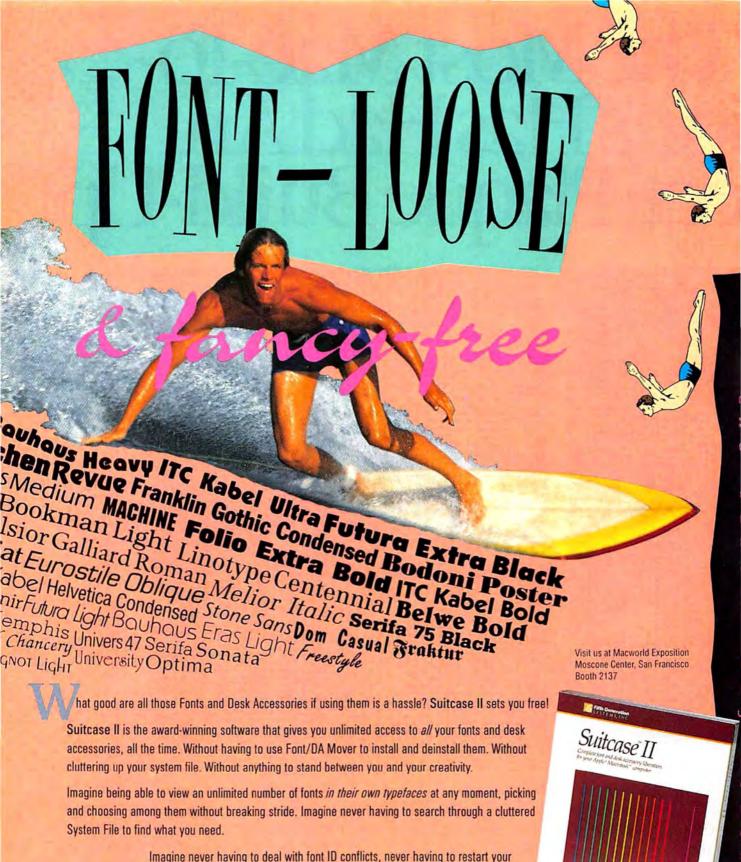
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Here's how we will complain about this computer:

User's Objection: "Why would anyone buy this computer? With a Macintosh IIwhatever, I have 3-D graphics and animation right now. I don't mind spending 90% of the time looking at the watch icon."

Power User's Objection: "There's no software for it. I can't run Excel or PageMaker. It's not MS-DOS-, UNIX-, or Macintosh-compatible. And it's too expensive. I can get a Mac Plus for \$250."

Developer's Objection: "Your installed base is much too small, and there's no documentation, technical support, or free development units. We'll try to port our Mac software as soon

The End Is Near

acintosh isn't going to last forever. Nothing wonderful ever lasts forever. All over Silicon Valley and points east, engineers are creating the next personal-computer architecture. (Well, maybe Macintosh isn'tending as much as the future is coming.) It's not going to be Macintosh-compatible, and (we) Macintosh bigots have to come to grips with that fact.

What will the computer of the future be like? If I had to guess, I'd place two bets. The first is a pen- or stylus-based notebook computer with handwriting recognition. The second is a computer with a 3-D interface based on RISC technology.

The first kind of computer will work like this: You (hand)print with an electronic pen on a notebook-sized display, and the computer transforms your marks into text.

Rather than cutting and pasting, you'll use copyediting commands: Slash through a word to delete it; draw in a carat (^) to mark an insertion point and add text. Draw a rough sphere, and the computer turns it into a circle.

Initially, this computer is going to run into all kinds of resistance from us. (Us, believe it or not, will be the establishment at that time.) Here's how we will complain about it:

User's Objection: "The handwriting recognition is lousy. When I type an a with Macintosh, at least I know I'll get an a."

Power User's Objection: "There's no software for it. I can't run Excel or PageMaker. It's not MS-DOS-, UNIX-, or Macintosh-compatible. And it's too expensive. I can get a Mac Plus for \$250."

Developer's Objection: "Your installed base is much too small, and there's no documentation, technical support, or free development units. We'll try to port our Mac software as soon as we get the next rev out."

The second kind of computer will have a 3-D interface. Basically, some company is going to throw all the RISC as we get the next rev out."

Do these kinds of objections sound familiar? They should. They're basically what the pundits said about Macintosh in 1984 – 1985. Look how wrong they were.

INSIDE THE PALACE

If either (or both) of these computers are developed by Apple, there's going to be a wonderful palace revolt.

All the cool people will be working on the new machine. They will fly first class, drink freshly squeezed orange juice, and get massages at their desks. Generally, the bozos and B-players will be the Macintosh engineers. The C-players will be the Macintosh marketeers.

Apple will introduce the computer with an ad during the 1992 Super Bowl. The ad will depict a beautiful blond woman running through San Francisco's Moscone Convention Center as giant trackballs chase her. She will hurl a giant Mont Blanc-penlike javelin at a giant Mac happy face on a giant Mac screen. The next day, the Apple phone system will crash as thousands of Mac owners call to complain.

Apple will hire ex-jewelers to evangelize software companies. ngineers are creating the next personal computer — and it won't be Mac-compatible.



By Guy Kawasaki

KAWASAK

Macintosh ROMs.

Business users will express interest in buying the new computer, and the Macintosh marketing (re-)organization will panic. Regis McKenna will come up with this positioning statement: "Macintosh is our mainstream business product. It is for small, medium, and large businesses; homes; and dorms. Our

At first, they'll try the obvious companies such as Aldus, Adobe, Claris, and CE Software. These companies will demand development contracts, do a bozo port, and fail miserably. Microsoft, however, will do a spreadsheet program in exchange for a perpetual no-cost license for

e have two years to emotionally prepare for the beginning of the end of Macintosh, and five more years before it actually happens.

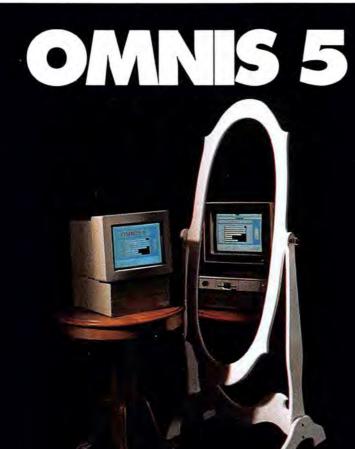
new computer is for carpal-tunnel-syndrome sufferers in the '90s."

ENLIGHTENED BIGOTRY

I may have the specifics of these new technologies wrong, but something like this will happen. We can either dig in our heels and resist change, or we can embrace it. I know that this is going to be tough — probably tougher on me than on you.

That's why I wrote this column now. The beginning of the end will start in about two years ("1992 won't be like 1984"). Of course, from the time it begins, it will take five more years before there's real software and hardware. That means we have two years to emotionally prepare for the beginning of the end of Macintosh. And then we have five more years before it actually happens.

Macintosh bigots we may be. But at least let us be *enlightened* Macintosh bigots. Weknow how we feel about people who still cling to their IBM PCs. Let's not have people think about us in that awful way.



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Start Up

A Power Play

One of the beauties of owning a Macintosh is that you immediately think that you can run Apple better than its management can. This month you can really try to. Cut out the puppets, fold along the dotted lines, and place them on your fingers. We've included a sample play for your first Apple executive-staff meeting.

The players (in approximate order of size of golden parachute): **John Sculley** — Chairman, Apple Computer

Mike Spindler — President, Apple Europe

Jean-Louis Gassée — President, Apple Products

Allan Loren - President, Apple USA

Bill Campbell (offstage) — President, Claris Corp. Secretary



December 1989

John Sculley: I just got the latest release of MacDraw, and it creates great chain-of-command charts. So let's reorganize the company.

Mike Spindler: Let's start with Apple USA.

Jean-Louis Gassée: Oui, oui. **Allan Loren:** Why are you starting with me?

Mike Spindler: You have the lowest profits

Allan Loren: Don't you think we should talk about the 90-day warranty? Third-world countries such as Canada and France have 12-month warranties. I think we should do the same for U.S. customers.

Jean-Louis Gassée: May I point out that the French had palaces when Americans were running around naked.

Allan Loren: Then why did you buy a palace in Palo Alto?

John Sculley: Enough from you guys. I gave you all your own divisions so you wouldn't fight.

[Silence.]

Curtain



January 1990

Jean-Louis Gassée: There's a bug in MacDraw: The chairman's box can be connected to only three direct reports.

John Sculley: What can we do? Why don't you resign, Allan?

Allan Loren: Resign? Me? I'm just getting the hang of this place.

Jean-Louis Gassée: You're getting the hang of this place? This place is getting ready to hang you.

Allan Loren: Can we get back to the warranty issue?

Jean-Louis Gassée: We don't need to extend the warranty. My engineers make computers so good they never break down.

[A knock on the door; a secretary peeks in.]

Secretary: Jean-Louis, your wife is on the phone. She says it's urgent. The Quantum hard disk in your Mac Ilcx won't start up.

Curtain



February 1990

John Sculley: Hey, I can connect only two boxes to the chairman's box.

Mike Spindler: I've got an idea. Why don't you put me in one box as chief operating officer and put your administrative aide in the other?

Jean-Louis Gassée: There's no way I'm going to work for Mike.

John Sculley: That's not a bad idea. Who thought of this four-president structure anyway? I'll tell you what, Jean-Louis: You can stay a direct report to me.

Jean-Louis Gassée: What's the catch?

John Sculley: I thought you'd never ask. I want you to give responsibility for product marketing and manufacturing to Mike.

Curtain



By Guy Kawasaki



John Sculley: So how are this quarter's sales, Mike?

Mike Spindler: We're doing great, John. We already have a 40% share of the Helocar market. That's 39% better than the Infiniti. Boy, their ads are dumb. They should show product the way we do.

John Sculley: Remind me to use MacroMind Director to congratulate the BBDO team. Is the press still bugging you about the reorg?

Mike Spindler: Which reorg?

John Sculley: I've lost track. Oh, it must be the one where Allan and what's-his-name left and you became COO.

Mike Spindler: [Chuckles.] Too bad we already used that line about blowing up Del so we could get closer to the customer. I heard that Jean-Louis and Allan are starting a consulting firm called GALL — Gassée And Loren Limited. Or was that GAUL?

John Sculley: We should get Regis McKenna on the phone.

Intermission

John Sculley: RMI said to stick to the party line that a COO would help Apple better coordinate business operations while streamlining day-today operations.

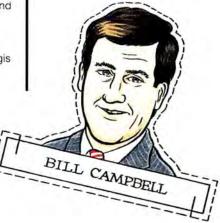
Mike Spindler: Sounds good to me. Secretary: I'm sorry to interrupt again, but Bill Campbell's on the line. John Sculley: What does he want? Secretary: He wants to know when

Claris can go public.

John Sculley: Tell him that he can't go public until he agrees to publish HyperCard stacks.

Secretary: John, Jean-Louis called too. He wanted to know if you wanted to buy some Perrier real cheap for the exec staff off-sites.

Curtain



NewsLine

Reports and Analysis

GASSÉE GONE?

CUPERTINO, CA - In a month full of highlevel turmoil at Apple, Jean-Louis Gassée, president of Apple Products, has reportedly offered his resignation. Rumors of Gassée's departure come less than two weeks after the resignation of Apple USA president Allan Loren. These events potentially leave the company in a leadership vacuum as its stock takes a beating on the market and criticism of Apple's product direction has become more heated. Although Apple had not officially confirmed Gassée's departure at press time, it's widely believed that the primary reason for the delay is that the terms of the flamboyant Frenchman's departure have yet to be agreed on. Meanwhile, many Apple employees have rallied to Gassée's cause, even holding demonstrations outside his office window to show their support.

CLARIS COMING TO SQL

SANTA CLARA, CA — Claris has purchased SQL technology from Red Brick Systems. The technology was originally marketed as EQT (Executive Query Tool). EQT lets Mac users browse through and download information from a mainframe SQL database without having to understand SQL. Queries are made with familiar Mac click-and-drag techniques. Claris plans to market the technology in a stand-alone product that's expected to ship before 1991.

ALDUS/SILICON BEACH DEAL DONE

SAN FRANCISCO, CA — As expected, Aldus has formally announced that it will acquire Silicon Beach Software. Silicon Beach will become a wholly owned subsidiary of Aldus but will continue to operate as an independent company. The responsibility for technical support of Silicon Beach's product line is still unclear, but Silicon Beach has indicated that it plans to continue supporting its products. Charlie Jackson, Silicon Beach's president and founder, will assist in the transition and will continue his association with the company as a consultant. Personal Press, Silicon Beach's planned low-end page-layout package, is due to be released soon.

IBM TAKES NEXTSTEP

ARMONK, NY — In the first tangible result of their previously announced partnership, IBM announced that it will use NeXT Computer's NextStep interface and development environment on its newest PS/2 computers and future workstations running AIX, IBM's version of UNIX.

Start Up

Rohker's Dozer

BY STEVEN BOBKER

Bobker's Dozen, c/o MacUser 950 Tower Lane, 18th Floor Foster City, CA 94404

Your suggestions, comments, and products for consideration are welcome.

lmage Grabber

In some ways, Image Grabber is a throwback to earlier screen grabbers such as Camera. It's a DA and therefore can't be invoked via an Fkey. But because it is a DA, it's very small, ultrastable, and compatible with all Macs.

Like Camera, Image Grabber has a time-delay mode, so you can set up the screen as desired - complete with pull-down menus. You can capture both 8- and 24-bit-color screens, as well as color screens in 2-bit black-and-white, without switching your monitor's cdev. The dialog box in which you select a file type or destination shows how much disk space the capture area you've selected requires. You can shoot screens that cover multiple monitors, although not in the time-delay mode.

Image Grabber saves screens to the Clipboard as MacPaint or PICT files, or sends them directly to the printer. Color printing is supported. You can also save screen areas as icons. This feature is useful when you're creating such things as help

screens and icons.



Image Grabber has outstanding performance and reliability, and the excellent manual clearly explains all phases of operation.

Sabastian Software, P.O. Box 70278, Bellevue, WA 98007; (206) 861-0602. Version 2.0. \$90.

KidsMath

KidsMath is a set of eight arithmetic games aimed at children between 3 and 8.

That's a rather ambitious goal, as it covers the widely differing capabilities of preschoolers to thirdgraders. In fact, Kids-Math will prove tough for younger users.

Most eight-year-olds, however, will find it to be plenty of educational fun.

Unfortunately, KidsMath doesn't take advantage of larger-than-9-inch Mac screens or color. Color, in particular, would make the details of the games easier to see and would grab attention more effectively. And the clarity of the visual clues is poor. Expect to have to teach a nonreading child how to play KidsMath. There are some

other flaws too. For example, in the arcadelike Paddle Ball, it's not enough to click on the right answer. The child must also click on the OK button at the bottom of the column of

numbers.

But the games offer a sufficient variety of challenges to hold a child's interest, and several have exceptional features, such as animated coaching when the child selects the wrong answer.

Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066; (408) 438-1990. Version 1.1. \$49.95.

Design Your Own Home: Architecture

Whether you're designing your new abode or simply moving, a good floor plan can make

the job of arranging your possessions much easier. Design Your Own Home gives you just that. Using a basic drawing engine that most users will be comfortable with, it adds powerful grid and dimensioning features.

Everything is drawn to one of 12 common architectural drawing scales. Changing the scale is a one-step process, but it's usually necessary to do some minor touch-ups of interior objects and text.

The basic package comes with two dozen sample floor plans in a variety of styles, and other libraries of plans are available. A wide selection of standard electrical and plumbing symbols and furniture shapes is also included.

The primary virtue of Design Your Own Home is the



inclusion of a wide variety of shapes and symbols and full floor plans. These are real time- and work-savers.

Abracadata, P.O. Box 2440, Eugene, OR 97402; (503) 342-3030. \$99.95; additional libraries \$29.95 each.

JetLink Express

The JetLink Express reviewed here is an updated version of the program reviewed in the January '90 issue. It now supports Hewlett-Packard's excellent DeskWriter ink-jet printer (see Bobker's Dozen, April '90).

JetLink Express prints most material about 10 to 15 percent faster than the generic HP driver - a barely noticeable degree that's significant only if you frequently print very long jobs. It does print gray-scale art noticeably better. Text quality would improve if GDT provided better-looking fonts.

GDT Softworks, 4864 Lougheed Highway, Suite 188, Burnaby, BC V5C 687, Canada; (800) 663-6222 or (604) 291-9121. Version 1.0.2. \$149

BOBKER'S DOZEN

Writer's Dreamtools

The three HyperCard stacks that make up Writer's Dreamtools are not your ordinary writing aids. They're useful, well-organized, easily accessible collections of data.

The first stack is called Events Day by Day. It lists, by day and date, thousands of birthdays and historical events, the feast days of every saint, and holidays around the world. There's also space for users to add their own information. This tool is fascinating just to browse around in.

The next, and largest, stack is Clichés and Catch Phrases. The author says there are more than 12,500 — that count seems conservative, as there's an absolutely awesome range of phrases here. Locate items by clicking on keyword buttons — there are more than 1,700 of these! You can move phrases you want to consider to a "shortlist" and print them out from there.

Be warned: Clichés and Catch Phrases contains explicit material that might offend some. This stack should be kept away from children.

The third and final stack is the first usable slang thesaurus I've ever seen. It provides words that meet all your criteria, neatly organized by part of speech. It's easy to navigate around within the stack, thanks to the well-designed interface.

The slang thesaurus comes in both G- and X-rated versions. The warning above also applies to the X-rated version.

Slippery Disks, P.O. Box 1126, Los Angeles, CA 90069 (mail-order only). \$35 each; \$79 for all three.

CasioLink

The latest generation of hand-held electronic books are small wonders. But those withmirrors the functionality of

out a Mac interface aren't much better than their traditional paper predecessors. Casio's series of **BOSS** (Business Organizer Scheduling System)

diaries is one of the more powerful and popular Macinterface systems currently available.

CasioLink software consists of an application, a HyperCard stack, and the allimportant connecting serial cable. The cable fits any Mac, offering both DB-9 and Mini-8 connectors.

The basic software is nothing special, but it faithfully

> the BOSS software. The software exports data in comma- and tab-delimited formats and imports tabdelimited ASCII text files. The stack lets you install but-

tons in your HyperCard Home stack that allow sharing data with Focal Point II.

Everything in the package works well, if not particularly quickly. CasioLink adds considerable value to the BOSS.

Traveling Software, 18702 North Creek Parkway, Bothell, WA 98011; (800) 343-8080 or (206) 483-8088. Version 1.0. \$109.95.

Tidy It Up!

Tidy It Up! is a simple and completely safe application that organizes and straightens up your System Folder. It's quick and does a very good job. The interface is unusually attractive and intuitive. Since all it does is move files around, it can't harm anything or System

The categories Tidy It Up! uses are fully user-customizable, and there's an adequate

cause conflicts.

variety of arrangements from

which to choose. Categories are generally denoted by empty folders that carry the category name. It's also possible to code by color.

If you like a neat hard disk with a wellorganized System Folder, Tidy It Up! is a must. It's shareware and available on most major BBSs.

Guy Fiems, 77 av. Leopold III, 1970 Wezembeek-Oppem, Belgium. Version 1.0. Shareware: \$15.

DataMerge

DataMerge is designed to simplify the manipulation of tabular data. It works with all major spreadsheet programs and datamanipulation software. The only requirement is that the program be able to save or export data as columns of text.

It can merge up to nine files, which can be larger than available RAM, although that will slow performance. Input files can have up to 256 columns, but output files are limited to a 99column width. Columns in the input files can be separated by tabs, commas, colons, semicolons, single spaces, or groups of spaces. It can also read columns defined by character count. And it has an even wider variety of output options.

DataMerge's performance is excellent. DataMerge belongs in the libraries of people who manipulate large amounts of data. Seawell Microsystems, P.O. Box 22030, Seattle, WA 98122; (800) 347-

7008 or (206) 322-3123. Version 2.0. \$99.

Pipe Dream

Pipe Dream is a great arcade-style game. It doesn't move too fast at the middle levels and always rewards foresight and strategy. The game involves placing "pipe" sections in an unbroken chain. "Fluid" moves through the pipe; you must keep ahead of it for a distance that varies, depending on the level.

Pipe Dream is the best new game I've played since Crystal Quest (April '88). The reasonable copy protection is based on the manual (you must enter a code). Pipe Dream doesn't make much use of color and uses only the area of a 9-inch Mac screen. But it runs fine under Multi-Finder — important to game addicts.

LucasFilm Ltd., Games Division, P.O. Box 10307, San Rafael, CA 94912; (415) 662-1902. \$39.95.

Start Up

BOBKER'S DOZEN

🔟 Partner

Partner is a neat new INIT that makes the graphics-editing and -embedding process much less painful than it usually is in DTP. It lets you use

graphics applications without ever leaving your publication. It achieves this by linking its own power with that of MultiFinder.

Partner works with MacWrite II, Word 3.02 and 4.0, PageMaker (3.01 or later), and QuarkXPress (2.11 or later). It supports several graphics programs, including MacDraw, MacDraw II, Illustrator, Illustrator 88, Free-Hand, MacPaint II, FullPaint, SuperPaint, and Canvas.

Its most valuable feature, at least for me, is the ability to edit graphics in place. You

can also use your graphics program to create images from within your DTP software. Partner is also able to put

graphics files into software that does not normally accept them. For example, you can embed Free-Hand graphics in Word.

Files can get very large, resulting in a performance slowdown. The manual says all you need is I megabyte of RAM. It's kidding. Two megabytes is the absolute minimum. Nonetheless, Partner is a slick effort.

Salient, 3101 Avalon Court, Palo Alto, CA 94306; (415) 852-9567. Version 1.0. \$99.

💶 Shadow

Shadow, an easy-to-use DA, is designed to automatically back up selected files, both at specified time intervals and with specific actions. This versatility hasn't been matched in Mac backup utilities, and performance is usually excellent. There are some programs that use nonstandard Save commands, however, that it simply can't handle. Unfortunately that list includes major programs such as Excel 2.2. Also, Shadow can automatically save or back up only 99 files per list. It's best for fre-

quently backing up your main working documents. If you have many of them, however, Shadow - ordinarily a very quick program - takes too much time to do its chores. If you're not careful, it can become a drag on productivity.

If you tend to be lax about saving and/or



backing up, Shadow could well save your bacon. Natural Intelligence, 86 Richdale Ave., Cambridge, MA 02140; (800)

999-4649 or (617) 266-7858. Version 1.23, \$49.95.

MicroNet MS62

Sometimes benchmarks aren't the most relevant measure of a piece of hardware. When the February '90 MacUser Labs report "101 Hard Drives" stated that the MS62 was very slow less than half as fast as any similarly sized unit — I decided to do some checking on my own. True, this isn't the fastest harddisk drive, but it launches Word, Excel, and Studio/8 about as fast as any hard-disk drive I've ever used. By every measure I checked, the MicroNet is a world-class performer.

Although the lab report explains why the MS62 gets only four mice, you should also take into consideration that it has many features found in more highly rated hard-disk drives. Although it's no bigger than other zero-footprint units, it weighs several pounds more. That extra weight manifests itself in the Rolls-Royce-quality construction. The case can take

abuse.

The software (the review covered version 4.0g; I have 4.0k) is outstanding. I have long considered LaCie's SilverLining to be the paradigm of hard-disk utility software, but MicroNet Utilities 4.0k is now in second place on my list - and it's even better than SilverLining in some respects.

Another plus for MS62 purchasers is MicroNet's reputation for service and backup. There is no hard-diskdrive company that supports its products any better.

MicroNet Technology, 20 Mason, Irvine, CA 92718; (714) 837-6033. \$1.095.

🛂 Layouts

Layouts, a five-disk set of PageMaker templates (sets for other page-layout programs are available too), is one of the better examples of such collections.

The templates include business cards, envelopes, letterheads, newsletters, fliers, brochures, and business reply cards. You'll find instructions, tips for use, and reduced-size illustrations of all the layouts in the manual. Some

of the layouts also have directions built in.

In all cases, the templates make allowance for real-world printing. For example, you can group the business cards four-up for mosteconomical printing. The manual explains it well.

Most of the files contain multiple designs, which saves disk space, and choosing the design you want is a snap. There are hundreds of useful



designs in this set. Working with Layouts is a real pleasure.

Starburst Designs, 1973 N. Nellis Blvd., Suite 315, Las Vegas, NV 89115; (702) 453-3371. \$179.



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StartUp

Pinstripe Picks

BY ROBERT R. WIGGINS

The Microsoft Office

The Microsoft Office CD-ROM disc is an incredible bargain. It consists of Word, Excel, PowerPoint, and Mail with on-line documentation, anima-

tion, graphics, sound, and dozens of extras at a special price. Microsoft - which has a big investment in CD-ROM technology has an ulterior motive:

to provide enough incentive to

get you to hop onto the CD-ROM bandwagon. And the deal Microsoft is offering just might be good enough to make it finally worth in-

vesting in a CD-ROM drive.

The Microsoft Office CD-ROM disc comprises a startup stack that lets you install the applications, as well as some support files, on your hard disk. Then you use The Microsoft Office HyperCard stack to access everything remaining on the CD-ROM disc as well as the applications you've just installed on your hard disk. Fifteen megabytes of fully animated tours created with MacroMind Director are available to get you started. Once you're up to speed, The Microsoft Office stack serves as a menu and navigation system for accessing 25

megabytes of HyperCard documentation stacks and installing the many extras. The documentation takes full advantage of the medium by including recorded sequences that demonstrate various operations and by making nearly every word (except for pronouns and articles) "hot," so all you have to do is select

> some text and the stack will scan for all occurrences of that topic.

There are more than 40 megabytes of extras that range from a complete set of screen fonts

for the Adobe Type Library to the Fish cdev that lets animated fish swim across your desktop. Clip art for use in PowerPoint and Word is included from T/Maker, Multi-Ad Services, Emerald City Software, and Genigraphics. Demonstration versions and sample stacks are included for many products, including Works, the Xiphias Time Table of History, GOfer, Excellent Exchange templates, and Business Plan Toolkit. Many functional programs and templates are also included, such as Word Finder, GeoQuery, SmartScrap, DocuComp, What's Best!, AutoMac III, AutoSave, and Financial Calculator.

Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399; (206) 882-8080. \$949.

FlexForm Business Templates

FlexForm's templates are intended to free you from having to design your own forms. You can just use these forms, created by the FORMula team of information specialists, as they come, using the supplied SmartForm Assistant program, or you can purchase SmartForm Designer and modify them. (See "In Good Form," January '90 for more information on forms-design software.)

FlexForm Business Templates: General Business, Volume I consists of 46 templates, including forms for inventory, production, selling, delivery, billing, collections,



and envelopes. Volume II includes purchasing, receiving, accounting, employee/ payroll, disbursing, and envelope forms, and miscellaneous forms such as a faxtransmittal sheet.

These templates are very good, designed to work with high-quality output devices such as the LaserWriter while remaining attractive on ImageWriters.

One caveat: Be sure you're buying the General Business templates, because Antic has another line that is also called FlexForm Business Templates, which is a line of Page-Maker templates.

Antic Software, 544 Second St., San Francisco, CA 94107; (415) 957-0886. \$89.95 per volume.

Sales and Market Forecasting Toolkit

Tim Berry has carved out a small niche in the business-productivity-software market, offering toolkits consisting of spreadsheet (and sometimes word-processing) templates along with excellent documentation. The Sales and Market Forecasting (SMF) Toolkit consists of 18 worksheets, 8 charts, and 1 macro sheet, all Excel-based. SMF Toolkit also comes with an added attraction, Berry's Forecaster application program (also available separately), which lets you create a graph visually and then shows you the numbers needed to produce the chart. (If you need

more of this kind of functionality, look into Flexigraphs [see Pinstripe Picks, April '90].)

SMF Toolkit is designed to teach you how to do your own forecasts rather than just plugging numbers into templates. The manual is more a textbook than a reference manual and explains each step along the way. Although it is only 114 pages, it manages to give you all the information you need to start using Excel spreadsheets and graphics to produce market forecasts.

Palo Alto Software, 260 Sheridan Ave., Suite 219, Palo Alto, CA 94306; (415) 325-3190. Version 2.0. \$129.95.

BUSINESS BOOKSHELF

The California Nonprofit Corporation Handbook

Nolo Press has a long history of saving people legal fees, and *The California Nonprofit Handbook* continues the tradition by helping you form a nonprofit corporation. The book includes an overview of nonprofit corporations, California corporation law, and the requirements to get a federal 501(C)(3) income-tax exemption, as well as a complete description of all the details you need to know. All the forms necessary for setting up a nonprofit corporation are included as tear-outs in the book, as well as in Word, MacWrite, and text format on-disk.

Each step is covered in detail, from preparing and submit-

ting federal and California tax-exemption applications, to preparing and filing articles of incorporation and preparing bylaws, to preparing the minutes of the first meeting of directors. Supplemental forms are also included, such as a bill of sale (for transferring assets into your new corporation) and certification provisions for board actions.

If you're thinking of forming a nonprofit corporation in California, you'll find this handbook invaluable.

Noio Press, 950 Parker St., Berkeley, CA 94710; (415) 549-1976. \$69.95.



PartnersLTD

PartnersLTD is a set of boilerplate documents to help you set up a limited partnership. It includes an Offering Circular (including Subscription Application, Purchaser Qualification Questionnaire, and Power of Attorney), Restated Limited Partnership Agreement, Living Trust, and a Buy/Sell Agreement for Shareholders. The documents are fairly comprehensive and total more than 60 8.5-x-11-inch pages of dense type when printed.

Using these templates (which can be read into MacWrite 4.5, Word 3-compatible word processors, Excel 1.3, or any SYLK-compatible files) is no substitute for having a lawyer, as the documentation clearly states. But you can save money by having an attorney review your finished documents instead of creating them from scratch.

JIAN, 127 Second St., Top Floor, Los Altos, CA 94022; (800) 442-7373 or (415) 941-9191. Version 2.2. \$149.

Retail Engine

Retail Engine is a point-of-sale and inventory-management system for apparel retailers (although any retailer could conceivably adapt to it). The front end of Retail Engine is Point of Sale, which runs on a Mac at the counter (for back-room operations, there is a similar application, Sales Recorder). Point of Sale can handle just about any kind of sales operation, including sales on account, resales, back orders, gift certificates, voided transactions, and even multiple sales-tax jurisdictions. With the optional barcode scanner and cash drawer, Point of Sale becomes a cash register as well. It can produce several reports and print packing lists; duplicate receipts; price tags with bar codes; and reference lists of salespeople, tax types, or payment types.

Retail Engine Manager processes all sales entered through Point of Sale (or Sales Recorder). The Manager handles all inventory-related tasks such as purchasing and receiving and can also produce dozens of reports covering sales, inventory, accounts receivable, and transaction summaries.

Retail Engine is a solid system that comes with good documentation, but it isn't perfect. The interface is unattractive and not always intuitive, and functions such as lookups can't be used in the middle of a transaction. Some of Retail Engine's flaws are due to limitations in Omnis 3, the program with which it was developed; when an Omnis 5 version is available (no projected date) it should make Retail Engine better.

Houlberg Development, 4533 Contour Blvd., Suite 4, P.O. Box 151501, San Diego, CA 92115; (619) 287-7444. Version 3.0. \$1,595 to \$3,145; Retail Engine Accounting, \$395; Bar Code Reader, \$595; Cash Drawer, \$497.50.

Letter Writer Plus

Letter Writer Plus, formerly ExpressWrite (see Bobker's Dozen, April '90), is a handy DA for creating correspondence on the fly. To go along with its new name, it has been substantially revised and is a better program than its predecessor. The interface has been improved. Its use of

icons for most common commands makes it unusually easy tolearn. Basic forms such as letterheads can be saved as stationery, and regularly used text can be saved as "paragraphs" and inserted where needed with a click. The program's text handling is good: Multiple styles and fonts are supported, but, unfortunately, tabs are not. The program's packaging has also been improved. The manual is much better than the previous version, and to get you started, there's a selection of 50 letters from the

LetterWorks collection (see Pinstripe Picks, March '90).

Letter Writer Plus now supports graphics for letterheads in a header area, but that's the only area where graphics can be placed — they're sorely missed in the return addresses of envelopes. Still, Letter Writer Plus is an excellent envelope printer. The mail-merge facility, which has always been excellent for light- and medium-duty jobs, is enhanced by the ability to use Address Book Plus files.

PowerUp! Software Corp., 2929 Campus Drive, San Mateo, CA 94403; (415) 345-5900. Version 1.0. \$89.95.

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BUSINESS

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4	5618	4th Dimension 2.0.10 469.
4	4024	4th Dimension Runtime 2.0.10 229.
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1	5608	DocuComp 1.2 89.
		A Lasting Impression
1	5465	ResumExpert
	5749	Cover Letters
	5745	
		Sales & Marketing, Students,
		Finance & Banking, Management
		Edition and Computer Science &
		Engineering each 39.
		Ashton-Tate
	1324	FullWrite 1.0 (free upgrade to 1.1) 55.
		Blyth Software
1	5492	Omnis 5 1.1
	5855	
	0000	Omnis 5 (Additional 1 user) 59.



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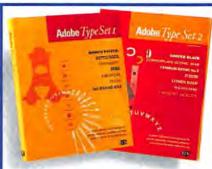
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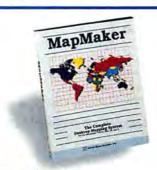
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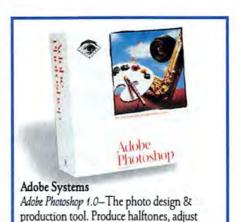
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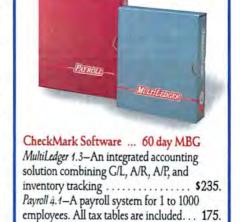
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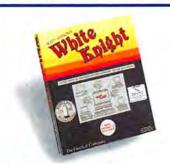
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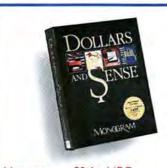
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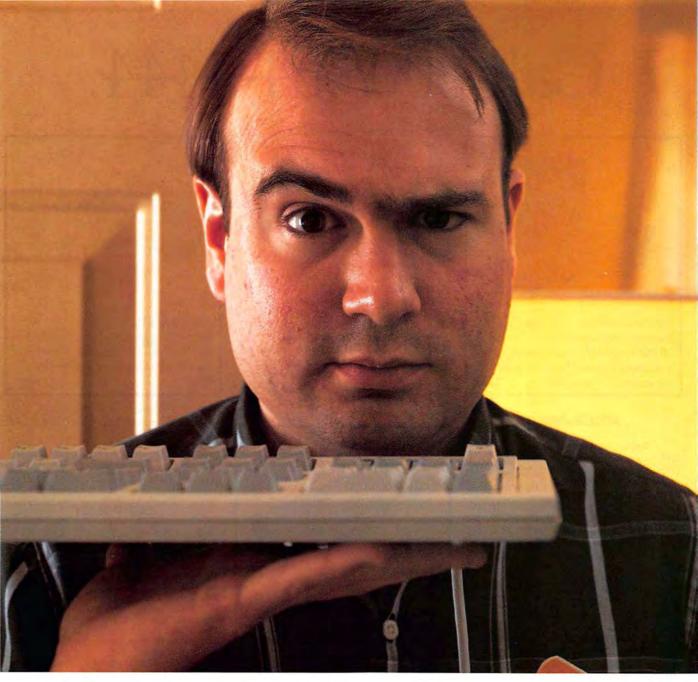


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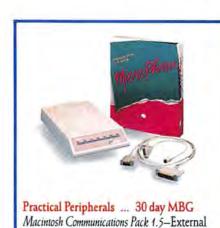
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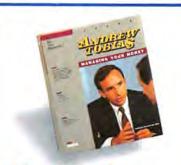


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Start Up

MULTIMEDIA

MicroTV

MicroTV brings broadcast video to your Mac, but is it more than just a gimmick?

It's a revolution. It's a gimmick. It's an inexpensive integration of computing and television. It's an expensive low-resolution, black-and-white TV, It's a powerful multimedia tool. It's a toy.

That pretty much sums up MicroTV, a NuBus card that lets you view broadcast or direct video input on your Mac screen. Most users probably don't need what MicroTV provides, but its real-time video-capture capability makes it useful as a cheap surveillance or storyboarding tool. It's a unique device, but uniqueness isn't enough to earn it an endorsement — at least not yet.

IS THE MEDIUM THE MESSAGE? MicroTV is a full-sized NuBus card that installs in a Mac II-family machine equipped with an 8-bit-color or gray-scale display. Aside from 32-bit QuickDraw, which Aapps provides on a disk, the only other software required is the Aapps MicroTV Sample Application, which is on the same disk. Launching the application brings up a window that looks like a DA: It's not resizable, and it doesn't have a normal title bar. What you see is a small window (128 x 108 pixels - about 1.5 x 1.25 inches) for the video image, as well as a channel selector, volume control, and on/off switch. The menus let you add channels directly to a menu, choose the video source (Direct Input or Standard Tuner) and resolution (Faster TV or Better TV), and select whether or not to view all the video controls.

With the sample application, you can do on-the-fly frame captures by pressing Command-C. The captured image is written to the Clipboard as a gray-scale PICT2 document, creating an image that's only as big as what you see on-screen.

Like most TVs, MicroTV has a tuner that's more sensitive to certain stations than others, so where your Mac is located and whether or not you have an external antenna have an impact on the image quality. But even direct videodisc playback yields only mediocre results.

MicroTV won't make you want to junk your Sony XBR. Its image is gray scale, small, and nonresizable, and the resolution is only fair. The Faster or Better video-resolution options don't have a noticeable effect. In fact, for comparison, we tuned a \$90 Sony Watchman to the same program and held it next to MicroTV; the Sony was markedly better in

MicroTV puts a tiny black-and-white TV onto your Mac screen. The screen shown here was created with the Aapps Video Professional configuration, which raises the image quality to standard VHS. The software lets you do on-the-fly frame captures, but the image and audio quality are poor.

contrast, brightness, and sharpness.

To help improve the resolution problem, Aapps has introduced Aapps Video Professional, a version of MicroTV with a daughterboard that raises the image quality to standard VHS. (An upgrade kit with just the daughterboard is also available.) The image is noticeably clearer, and the sample beta software doubled the image size to a more comfortable 3 x 2.5 inches (but it's still not resizable). The larger screen size slows the frame rate down to around 25 frames per second, even in the Faster video mode, which throws the sound completely out of sync.

MicroTV doesn't use the Mac's builtin audio capabilities. The sound is pumped through a tiny speaker mounted on the board, so the speaker doesn't face directly out of the Mac box. As a result, the sound is muffled, and in order to hear it, you have to turn up the volume, which overdrives the speaker.

THE BOTTOM LINE There are still some major questions surrounding this product. The board I received was one of the first units shipped, and it had several

visible wires — including a three-inch length on the back that actually had some slack in it. Presumably these will be eliminated in the final production run. The bigger questions concern image resolution and Aapps' approach to the product. Aapps calls its shipping application a "sample," because the company intends to concentrate on hardware, relying on third-party developers for its software. This route might work for a company

such as Apple, but it seems dubious in this kind of situation. For example, it's hard to image that Farallon's MacRecorder would have attained its success if that company hadn't provided software support and development.

MicroTV isn't for everyone. If you need frame capture, you'd be better off selecting one of the markedly better products, such as frame grabbers from Scion, Data Translation, and Advent. Or, if you need livevideo pass-through,

there are better products available, such as the Mass Micro system. If you do need both capabilities and you're on a budget, MicroTV may be a viable solution. And if you're the type of Mac user who has to have every imaginable accessory, you'll probably want to add MicroTV to your collection. But if all you really want to do is watch TV on your Mac, put a Sony Watchman on top of your monitor.

- Russell Ito

Get Info

MicroTV

Manufactured by: Aapps, 756 N. Pastoria Ave., Sunnyvale, CA 94086; (408) 735-8550. Version: 1.03 (Sample Application). List Price: \$395; Aapps Video Professional, \$595. TYPOGRAPHY

TypeAlign

With the first ATM utility. **Emerald City pushes the** limits of typography again.

With all the hoopla over Adobe Type Manager, it's no surprise that an ATM enhancer, or add-on, has already made the scene. TypeAlign is an elegant and engaging new type utility from Emerald City Software, the wizards who produced SmartArt.

PATH TYPE TypeAlign consists of an INIT and a DA that accesses the INIT's magic. The magic in this case is the ability to place text along circular, angled, or

arbitrary paths. Since the utility operates as a DA, you can create this kind of text "Untitled" at 100% k NEW BENEFIT FOR NEW MEMBERS Ao 0 ANIO NEWS B IN CHINA ELNA CONVENTION

TypeAlign is the first utility designed specifically to work with Adobe Type Manager. Its working window includes a variety of drawing and text tools. A grayed template and several text strings on paths are shown here.

BI SUMPIER COURSES SET

at any time. Alternatively, you can save TypeAlign text as EPSF, PICT, or Illustrator 88 files and import them later as graphics. In the past, placing text along paths could be a frustratingly involved process (as in Illustrator 88) or involved working in a stand-alone program (Free-Hand) or with buggy, noncommercial software (such as the shareware program Text Bender). TypeAlign does away with all that nonsense and makes the whole process easy.

Installation is simple. Drag the TypeAlign INIT into your System Folder (which must also contain ATM), and install the DA. Restart your Mac, and start to play.

When you choose TypeAlign from the Apple menu, the main TypeAlign window appears. If you choose the snapshot tool from the tool palette, the TypeAlign window turns transparent (à la The Clipper), allowing you to position the window over a document from another application. Click on the snapshot tool again, and a grayed copy of the area covered by the TypeAlign window remains. You can use this as a guide if you're creating a graphic to fit into a specific space.

You then draw a path with one of the DA's three line tools: straight line, arc, or freehand. You can select the font, style, point size, and a limited number of special effects from the TypeAlign menu. When you begin typing, the characters line up along the path you've defined. The text remains fully editable: You can kern letter pairs and align text left, right, centered, or justified.

Point sizes are limited to 9 to 144 points; type styles include plain, bold,

> italic, underline, outline, shadow, condensed, and extended. TypeAlign also includes four special effects: accent, which adds a slim outline to your text, and 25%. 50%, and 75% gray fill. Emerald City Software plans to add more special effects. (The company's programmers might want to keep ImageWriter owners in mind for some of the new effects they devise. The accent effect is simply too subtle to be of

any use on a low-resolution device such as the ImageWriter or even on the HP LaserJet.)

Once a text string is placed along a path, you can further distort the shape by dragging control points that appear when you select the text with the pointer tool. You can place the graphic into other programs via the Clipboard or by exporting the graphic as an EPSF, PICT, or Illustrator 88 file.

DRAWBACKS TypeAlign's use of the Clipboard is somewhat disappointing. You can create two or more text strings in



TypeAlign lets you produce some beautiful effects, such as the text curved along an arc.

the TypeAlign window, but when you choose Copy from the Edit menu, only the most recent or the currently selected string is copied to the Clipboard. This detracts from the program's usefulness. You should be able to Shift-select more than one text string in the TypeAlign window and copy all of them at once. Also, if you use the magnifying tool or in any way deselect the object on-screen, copying to the Clipboard doesn't work. A text object must be selected or have the cursor blinking in it. Future releases should correct these problems.

There are some other minor annoyances: TypeAlign graphics pasted into SuperCard print out poorly. And TypeAlign 1.0 graphics that are copied and pasted via the Clipboard sometimes print out with portions of the PostScript code showing. (If you experience this, contact Emerald City Software; version 1.0.2 fixes the problem.)

THE BOTTOM LINE MacUser's editors chose TypeAlign 1.0 as the Best Typographic Product of 1989. Its rough edges (caused, I suspect, by a hasty attempt to push the program to market before Christmas) should be smoothed out by the time you read this.

Gregory Wasson

Get Info

TypeAlign \$\$\$\$\$\frac{1}{2}

Published by: Emerald City Software, 1890 Shoreline Blvd., Mountain View, CA 94043; (415) 324-8080.

Version: 1.0.2. List Price: \$99.95.

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Grappler 9 Pin

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MX80

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None

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9 Pin

NP80S

PRINTERS

LabelWriter and Smart Label Printer

At last, two elegant printers address a sticky problem.

Even in the most technologically advanced offices, there's still one task that's almost invariably done manually: addressing envelopes. But that's not necessary anymore, thanks to a tiny thermal label printer built by Seiko Instruments and distributed by both that company and CoStar.

stick with support Unlike Seiko Instruments, CoStar is aggressively supporting its version, called the Label-Writer, which is the one I'll discuss. The LabelWriter is about the size of a tape dispenser and weighs just over a pound. An LED on the front indicates power and error conditions. On the back is an on/off switch, a label-advance button, an AC power socket, and a serial interface. To install it, you connect it to one of the Mac's RS-422 serial ports, plug in the power transformer, and add a DA.

Whenever you print a letter, simply copy the address to the Clipboard, select the LabelWriter DA, and click on the Print button. In roughly 25 seconds, the LabelWriter churns out a 3.5-x-1.125-inch, self-adhesive label with the recipient's name and address. (The print mechanism was designed to be wide enough to accommodate larger labels should they ever be introduced.)

The LabelWriter DA lets you set font, size, style, and justification, but any attributes you set apply to the entire label. Depending on the format, you can squeeze up to 9 lines or 213 characters onto each label. Presently you can print

only text, although you can fool the DA by converting graphics into a font, using a utility such as The Art Importer.



The memory feature lets you easily store commonly used labels for quick retrieval. And you can set options such as darkness, number of copies, and which serial port to use. Finally, with the supplied Code 39 font, you can generate bar codes of up to 13 characters.

The LabelWriter uses a thermal-direct print head that writes on heat-sensitive labels at a resolution of 72 x 105 dpi. It's extremely quiet, and there are no ribbons, toner, or cartridges to replace. It comes with one roll of labels, and CoStar sells additional rolls for about 5 cents per label. At that price, the LabelWriter isn't well suited to mass mailings, but its DA can automatically generate a strip of labels from existing mail lists.

THE BOTTOM LINE The LabelWriter is a boon for anyone who needs one-at-a-time

labels. With a street price of around \$200, it's a little expensive, but it sure beats manually feeding envelopes into a recalcitrant printer or digging out the

typewriter every time you need a label.

As much as I like the LabelWriter, it breaks some Macintosh guidelines: You can't specify the format of individual characters, and there is no provision for integrating graphics and text. These two complaints may be addressed shortly with the introduction of a printer driver that makes the LabelWriter Chooserselectable. CoStar also promises a Control Panel document called AutoLabel that will automatically find addresses on the first page of a word-processing document and print them on the LabelWriter whenever you send a letter to the main printer.



The LabelWriter (shown here) and Smart Label Printer come with the same DA that can print the contents of the Clipboard on standard 3.5-x-1.125-inch self-adhesive labels.

The Smart Label Printer from Seiko Instruments is functionally identical to the LabelWriter, but since CoStar is committed to improving its product (and includes two extra Casady & Greene fonts: Berkshire and Easy Street), the LabelWriter gets my recommendation.

- Owen W. Linzmayer

Get Info

LabelWriter \$\$\$\$

Manufactured by: CoStar Corp., 22 Bridge St., Greenwich, CT 06830; (800) 426-7827 or (203) 661-9700. List Price: \$249.95.

Smart Label Printer \$\$\$\$

Manufactured by: Seiko Instruments USA, PC Products Division, 1144 Ringwood Court, San Jose, CA 95131; (800) 888-0817, ext.104R or (408) 922-5900. List Price: \$249.95.

John Sculley Apple Computer, Inc. 20525 Mariani Avenue Cupertino, CA 95014

This sample label, reproduced at actual size, shows the output available from the LabelWriter's 72-x-105-dpi thermal-direct print head.

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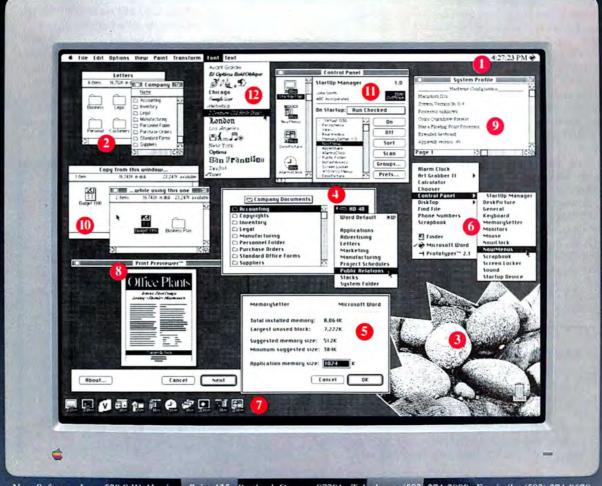
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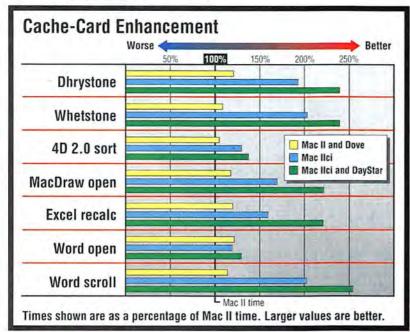
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PERFORMANCE ENHANCERS

Fast Cache Ilci and MaraThon Racer

Cache cards can accelerate your Mac without draining your budget.



Don't have enough cache? Third-party vendors are beginning to offer add-on cache hardware for people who don't have enough RAM to give up to the Control Panel's cache setting. I looked at a couple of these new cache boards for the Mac II and the IIci and found them to be a viable alternative for users who need better performance.

A RAM cache holds an application's required data in electronic memory until the CPU is ready to use it. Since accessing computer memory is faster than accessing a hard disk, a cache accelerates the CPU, getting information to it as fast as the CPU can use it. The resulting speed improvement is only a fraction of the boost you get with an accelerator, but it comes at a fraction of the cost.

FAST CACHE IICI

DayStar's Fast Cache IIci is designed specifically for the Mac IIci's

processor direct slot. It caches information in 64K of static RAM rated at 25 nanoseconds, which is more than three times faster than the IIci's own RAM. In actual performance, the Fast Cache increased the speed of the IIci between 5 and 40 percent, depending on the application, with an average speed increase of 23 percent. Recalculation of an Excel spreadsheet showed the most dramatic improvement - 39 percent - and the drawing speed of a complex MacDraw diagram increased by 31 percent. As fast as this may be, however, a cache card still doesn't bring a IIci up to the speed of the new IIfx (see "The Mac IIfx: Fast Times at Apple Computer" in this issue).

MARATHON RACER

The Dove MaraThon Racer card for the Macintosh II doesn't produce as much acceleration as the Fast Cache IIci, which is too bad, since the Mac II

needs acceleration more than the IIci does. Like the Fast Cache, the MaraThon Racer uses high-speed static RAM, but only half as much, boosting Mac II performance by 15 percent overall. Recalculation of the Excel spreadsheet improved by 21 percent. As shown in the chart, neither cache card did much to improve a 4th Dimension database sort.

One of the reasons that DayStar's cache card does more for the IIci than Dove's does for the Mac II is that the IIci was specifically designed with a cache card in mind. Also, since a Mac II wasn't specifically designed to accept a cache card, installing the Dove MaraThon Racer is a little tricky: You must remove your 68020 CPU. install it on the MaraThon Racer, and plug the cache board into the 68020 chip holder on the Mac's motherboard. Extra care should be used — especially when removing the CPU — to keep any of the 68020's 114 pins from bending.

THE BOTTOM LINE Even with these complications, I can still recommend the Dove MaraThon Racer as a good shot in the arm for the Mac II. Why? It retails for only \$259. At this price, there's no reason why every Mac II shouldn't have one.

Mac IIci users have to put out more cash: The Fast Cache IIci retails for slightly less than \$1,000. It's probably worth it for users doing high-end applications, such as 3-D CAD or 24-bit-color processing, but it's not for casual users.

— John Rizzo

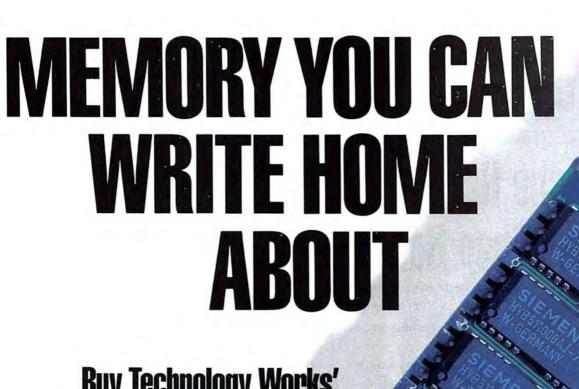
Get Info

Fast Cache Ilci

Manufactured by: DayStar Digital, 5556 Atlanta Highway, Flowery Branch, GA 30542; (800) 962-2077 or (404) 967-2077. List Price: \$995.

MaraThon Racer

Manufactured by: Dove Computer, 1200 N. 23rd St., Wilmington, NC 28405; (800) 622-7627 or (919) 763-9718. List Price: \$259.



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Finale 2.0, MusicProse, and Encore

Coda's newest Finale is better, but Passport Designs deserves the Encore.

The search for the perfect music-notation program is something akin to the quest for the Holy Grail, but that impossible dream is now closer to reality with the introduction of three new products: Coda Music Software's Finale 2.0 and MusicProse, and Passport Design's Encore. All three give professional music copyists, arrangers, and composers the ability to get some serious work done. FINALE 2.0

Finale 2.0 is the latest version of Coda's landmark music-notation/ sequencing program. Finale 1.0 was a major achievement but was overshadowed by its faults: It was too expensive and slow, had a clumsy interface, and offered too many choices (see "Measure for Measure," August '89). Thankfully,

Chopin Nocturne/MIDI file opened by Finale 11 2 0 E !!! 10 9 **3** 6 应图

Finale 2.0 is far better than its predecessor, but it's still burdened by a surfeit of choices. In Page View, for example, you're presented with a large tool palette, and most of the tools have their own menus.

all of these problems (and more) have been remedied. Finale 2.0 is one tight, mean monster of a program.

Following the informative manual's suggestions (and yes, there are still four manuals), I set my RAM cache to 2 megabytes. Coda suggests using a RAM disk for maximum speed. (Incidentally,

anyone seriously interested in creating music professionally on a Mac had better get as much speed and memory as the wallet will allow. I've learned this the hard way, and Coda warns Mac Plus users about this as well.)

The cache idea worked, and Finale now loads and redraws at blinding speed: 3 seconds for initial loading and 1 sec-

ond or less for redraws on the 8-megabyte Ilcx I used for testing. There is still a bewildering array of tools and choices to deal with, but the manual constantly exhorts the new user to "stay with it." And you should: It's worth it.

Finale is still the only music program that features both page view and score view and is capable of doing anything to music, from producing harp diagrams to adjusting the size and shape of the note heads themselves. Finale is especially adept with lyrics. Using the Mass Create

> option, you can type lyrics on your word processor and load them, and Finale automatically flows the words - complete with proper hyphens between notes - exactly where they belong. The program also features a Mass Part Extraction option that takes every line of a score and transfers that line to its own part - fast.

Finale gives you five methods of note entry: file importation (from any sequencing program that supports standard MIDI), real-time synth play, Mac

keyboard entry, step-time synth play, and traditional mouse click. "Speedy note entry" on the Mac keyboard is a real time-saver, and beats the old Graphic Notes Music Publisher at its own game. On the negative side: The tool icons don't identify their function when you click on them, so it's hard to remember

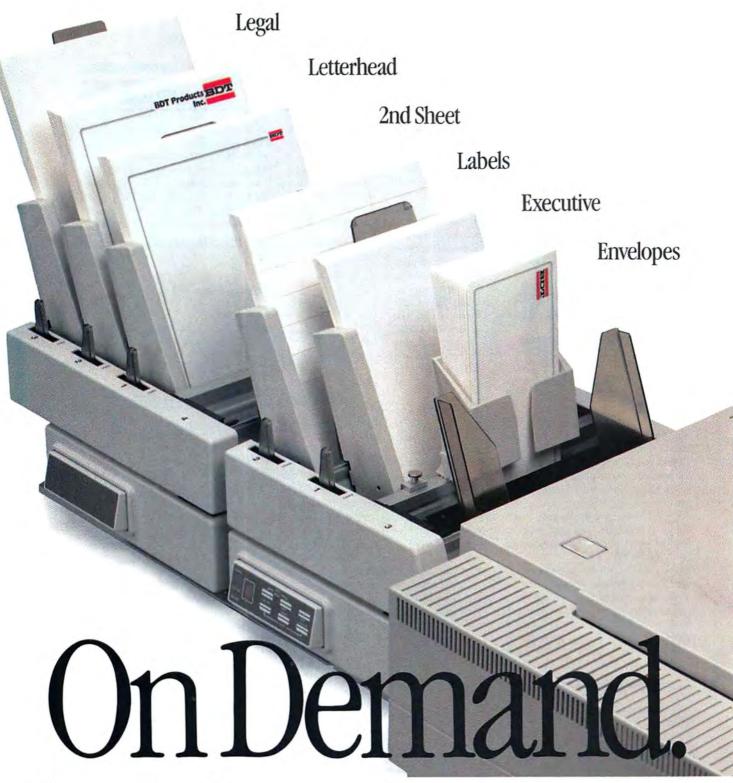


MusicProse is Coda's simplified version of Finale. Its Page View mode is similar to Finale's, but the tool palette is considerably smaller.

what they represent without looking at the fairly large "Quick Reference" card. Synthesizer owners without a pedal will also find it difficult to enter real-time music, since you have to tap in the beat while you're playing. Printing pages can be a nightmare, because Finale still uses EVPUs (Enigma virtual-page units) instead of inches or points, even though the tool that accesses them is called the "page layout" tool. There is an answer here, however: MusicProse, Finale's sister program.

MUSICPROSE

MusicProse is the name of what was to be called Finale Basic because that's what it is: a simpler version of Finale designed specifically for preparing lead sheets, piano-vocal parts, and small-ensemble scores and that uses inches instead of EVPUs. (Thank you, Coda.) Most of the good parts of Finale are here, along with some new good things, but the endless choices and the higher price tag are missing, MusicProse can import and play back just about anything, and it has a new, streamlined user interface and a much quicker learning curve (Finale still takes a good two months to get comfortable with). It lets users enter notation in the same way Finale does, because at the heart of both programs is the Enigma Music Toolkit



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Start Up

REVIEWS



Encore boasts an intuitive interface and a wonderful features list, and it's quite intelligent. You can import MIDI directly, and if you select Guess Durations and Beam on Beat from the Notes menu, the music winds up looking like this.

engine. Flexibility with lyrics and chords is also present, as are multiple layers of music with multiple voices in each layer.

ENCORE

This beautifully written program from Passport Designs combines some of the elements of its sister program, NoteWriter, with MIDI play and record capabilities. Encore features the same abilities as Finale and MusicProse; that is, it lets you enter music five different ways and can import and export to just about anything — but there the similarities end.

Encore's interface is very easy to understand and, therefore, its learning curve is very short. It's easy to figure out how things work without reading the manual. After only a few hours, I felt confident enough to use Encore for a real job.

Encore is "quasi-rules-based," which

means that it figures out some things for you and lets you do the rest. This is good because, as the extremely well-written (and often hilarious manual) points out, "computers aren't very smart." The manual also takes a wellaimed shot at Professional Composer's uncanny ability to turn MIDI data into tons of 64th notes. Encore doesn't make that mistake: When it "guesses" about the durations of what you've either played on a synth or imported as a MIDI file, it's usually

right. It can handle up to 64 tracks of MIDI data with four voices per staff, works well on older Mac models, and features a page-oriented display.

With Encore it's easy to make the page look the way you want it to look, since you can manipulate any object onscreen by just clicking on that object and moving it. Encore supports multiple files, and it can deal with large scores, piano parts (there's still no beaming across bar lines, but Passport's programmers are working on

that), and just about anything else you can dream up. I miss "auto-beaming" of 8th and 16th notes, but Passport says that's in the works too. (The company may hold a record for the speediest incorporation of user requests.)

THE BOTTOM LINE If you're serious about the music you write or play, one of these programs should be in your future. Finale packs sheer power, a much-improved interface, and better documentation, but it's best suited to professional publishers. universities, and anyone doing large-scale compositional and/or publishing projects in which absolute control over all the music elements is essential. MusicProse offers an easier-than-Finale feel and should run faster on Mac Pluses and SEs. It's good for users who do smaller projects and retains some degree of Finale's fabled powers and MIDI capabilities. Encore has a wonderful interface and



Encore imported a Performer 3.3 sequence file, saved as a standard MIDI file, as raw data. It easily converted the data to two staves and proper notation, and within 3 minutes, the music was ready to print.

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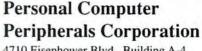






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REVIEWS

	cturne/MIDI file imported into Finale
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Finale opened the same MIDI file with lessthan-satisfactory results. The initial look was worse than this; although Encore didn't need to quantize the file, Finale did. The second attempt at opening the file, shown here, used 16th-note quantization, but the result is still way off the mark and needs a lot of work to get into printable shape.

intuitive features, and if it could beam across bar lines it'd be perfect. Still, it emerges as the all-around choice. Encore can handle the widest variety of projects with ease. And if you want to cover every contingency. Encore and MusicProse together make a formidable duet that should solve most notation problems.

— Ken Gruberman

Get Info

Encore

Published by: Passport Designs, 625 Miramontes St., Half Moon Bay, CA 94019; (415) 726-0280. Version: 1.1.6a.

List Price: \$595.

Finale 2.0

Published by: Coda Music Software, 1401 E. 79th St., Minneapolis, MN 55425-1126; (612) 854-1288. Version: 2.0.

List Price: \$749.

MusicProse

Published by: Coda Music Software, 1401 E. 79th St., Minneapolis, MN 55425-1126; (612) 854-1288. Version: 1.0. List Price: \$249.

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clever, and communicative. You want people to associate the product with Apple, so you check your thesaurus for some words to play with and come up with a few obvious choices, such as fruit, red, and produce. What you really need is a tool that will think along with you, helping you come up with apple-related concepts that aren't in a dictionary or thesaurus - such as British singing groups: wicked

witches; and, of course, computers. What you need is a brainstorming tool.

"Idea processor" and "thought processor" used to be nothing more than marketing euphemisms for programs such as MORE II and Inspiration that really aren't much more than outliners. Those second-generation outliners may offer novel and helpful ways to record and present your ideas and thoughts on-screen, but they don't actually add anything to your raw thoughts. Enter IdeaFisher and MindLink, two packages that aim to enhance the thinking process and to augment the results of your brainstorms. **IDEAFISHER**

Like many outliners, IdeaFisher is the kind of program you'll either love or ridicule. The heart of the program is a massive (8-disk, 7+-megabyte) database of words, phrases, clichés, and titles. The 60,000 "idea words and phrases" are cross-referenced in several ways: They're categorized under 28 "major categories" and 386 more-specific "topical categories" (a hierarchical organization like that of a real, nondictionary-style thesaurus).

Each word is also linked in sometimes surprising and idiosyncratic ways to

> more than 700,000 cross-references. own words, categories, and cross-reference associations as well

Several tools help you delve through the database, Orient-Clarify walks you through a series of stock questions about the nature of the problem you're facing, the subgoals that comprise the steps along the way to a solution, and so on. (You can add to and

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dozens of other words, for a total of You can add your

green/greenish Number of entries: 393 UARIETIES/EXAMPLES PEOPLE/ANIMALS THINGS/PLACES ABSTRACTIONS/INTANGIBLES UFRBS ACTIVITIES/EVENTS/PROCESSES DESCRIPTORS MISCELLANEOUS OK Cancel

wherever it may lead you. With Compare Topical Categories, you feed in two words or phrases, and the program searches for all words and phrases that are cross-referenced to both of the target words. The results can be anything from obvious to paradoxical to insightful. In any case, they can also lead you to the brink of making a creative leap that might otherwise not have occurred to you.

IdeaFisher isn't perfect. The all-text interface is functional but not attractive. Word associations are all treated equally; ideally, the program would include more sophisticated filters for distinguishing close word associations from weak ones, which would streamline the process. Overall, however, this is an impressive first release.

MINDLINK

MindLink focuses on the first part of the brainstorming process, guiding you through a structured "gymnasium" for exercising your intellect, helping you find answers by prompting you with questions. It's a bit like the old Eliza program - an ironic bit of early artificial intelligence that imitated a pop psychologist by asking vague questions about your state of mind and spitting back whatever you said as a question: "What's on your mind?" "I'm depressed." "So you say you're depressed?" Every now and then, Eliza introduced a calculated bit of outof-the-blueness - "I notice you haven't mentioned your mother . . . " - to keep the conversation going. This trivial program was intended to poke fun at Al by showing the absurdities of its limitiations, but many therapists took it seriously, and its programmer was beseiged by inquiries about his AI"breakthrough."



IdeaFisher is based on the principle that new ideas can emerge from the juxtaposition of existing ideas. Its database of 60,000 words and phrases is cross-indexed, providing a novel language and brainstorming tool.



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Start Up

REVIEWS

MindLink offers the same mix of structured Q&A and non sequitur as Eliza did — with comparable mixed results.

Suppose the problem at hand is a trillion-dollar federal deficit. MindLink walks you through a variety of intellec-

deaFisher is a real triumph of substance over style.

tual exercises in which you itemize every aspect of your problem, such as your campaign promise not to raise taxes, competition from overseas, the fluctuating value of the dollar, and so on. Next, it might randomly choose an object perhaps a watch - and ask you to ponder all of the aspects of "watchness" that pertain to your problem. Subsequently, you might be asked to list the ways in which a watch does not relate to your problem. Often you're asked to consult your own collection of random props - a newspaper, a magazine, or an item from the bag of trinkets that comes with Mind-Link (such as a cork or a toy airplane).

Sound absurd? That's the point. Mind-Link forces you to zero in on your problem while simultaneously encouraging creative leaps by abruptly shifting mental gears. According to current thinking about creativity, this sort of juxtaposition is where novel solutions to complex problems come from.

MindLink's principles (as well as its principals, the software designers) hail from Synectics, a successful consulting firm that has put this kind of technique to work in corporate America. Unfortunately, MindLink suffers from two weaknesses, one by necessity, and the other by design. Since it's a HyperCard stack, progress through the questions is slow enough to impede the free flow of thought it's designed to inspire. (HyperCard is also partly to blame for the uninspired quality of the summary reports MindLink generates.) The other problem is the same problem Eliza faced: The program may provide help to some, but many will find its approach pedantic. MindLink offers little more than a good book on creative problem solving, repeated over and over.

THE BOTTOM LINE There are some other.

less expensive options to dealing with the problems these programs try to address. If you just want a good database of phrases to bounce around, Writer's Dreamtools (see Bobker's Dozen in this issue) has a load of them. And the Heizer Software catalog lists several random-word databases designed to help you overcome thinker's block.

None of these programs is as focused as IdeaFisher or MindLink, however. IdeaFisher is especially helpful when the goal of your brainstorming is words (product names, titles, advertising slogans, and so on). MindLink is better suited for tackling large, multifaceted problems whose end result is likely to be a strategy or plan of action. MindLink imposes a reasonable methodology on your brainstorming that can prove helpful. It also provides, to paraphrase George Carlin, a place for your brainstorm stuff. But after a few runs, it can also prove monotonous. Once you've internalized the process, it leaves you wanting. To continue to be useful, it needs something more - a database like IdeaFisher's or more-helpful summary reports. (The stack could also benefit from a more functional, intuitive, and appealing design.)

IdeaFisher's database gives it a decided advantage over MindLink, even though the engine isn't exactly pretty and its mechanics also get repetitive. But of the two programs, IdeaFisher is a real triumph of substance over style.

— Jon Zilber

Get Info

ldeaFisher ttt

Published by: Fisher Idea Systems, 18881 Von Karman Ave., Ground Floor, Irvine, CA 92715; (714) 474-8111. List Price: \$495.

MindLink

3332

Published by: MindLink, Inc., Box 247, North Pomfret, VT 05053; (802) 457-2025.

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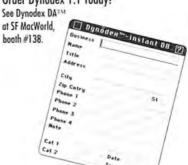
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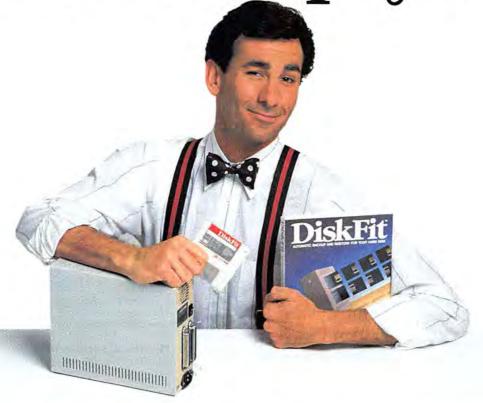
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Start Up

REVIEWS

GAMES

A new strategy game offers unlimited fun in an upscale limited edition.

Ishido is a first-class strategy game in the "a minute to learn, a lifetime to master" tradition. One object of the

game is to empty the 50 tiles from your "pouch" onto the 100 squares of the playing board. Naturally, there's a catch: Each tile shows a pattern and a shape. You can place a tile on the board only next to another tile of either the same pattern or the same shape. To place a tile in a space adjacent to two tiles.

you must match one by pattern and the other by shape. To place a tile in a space surrounded by four tiles, you must match two neighbors by pattern and two by shape. Making these four-way matches is the other object of the game.

If you're familiar with games such as Go and Shanghai, you can probably anticipate the kind of strategic tracking and planning needed to succeed at Ishido. The real surprises, though, are the in-

teresting little touches that are just as much a part of Ishido as its rules and strategies. Let's start with the one that hits you like a ton of tiles: the \$495 price. No, I didn't drop the decimal point. This "limited edition" game lists for almost \$500. (The game's creator, Publishing International. has sold the majority of the 1,000

units to a distributor; orders can be placed through J. Lawrence Enterprises ([800] 462-2162). In addition to status and exclusivity, the premium price gets you numbered editions of both color and blackand-white versions of the game software, illustrated manuals explaining the legend and meaning of the tiles, a distributable six-play version of the game with which to hook your friends, and a wooden case in which to store it all.

But if you haven't had oysters or Manhattan real estate named after you, you'll be relieved to know that a nonlimited edition of the game for the masses is in the

works; Accolade (550 S. Winchester Blvd., Suite 200, San Jose, CA 95128; [408] 985-1700) will be that version's distributor.

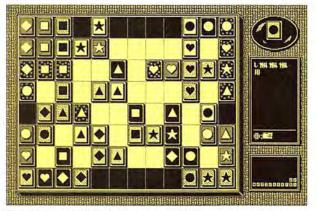
UPSCALE UPSHOT Ishido offers a host of other goodies: The menu bar is hidden during game play - eliminating distractions and enhancing the already stunning graphic

aesthetics - but pops into view whenever you click at the top of the screen. Also, Ishido converts all entries on its menus (as well as system menus) into its own special font and - another nice touch—transforms the menu bar's Apple logo into a yin-yang symbol.

There's an ample selection of alternative tile shapes and patterns, and you can edit and import your own for further variety. Naturally, there are solitaire and



The limited-edition version of Ishido, a new strategy game, has top-drawer packaging to house a top-notch program.



The object of Ishido is to place all your tiles on the game board. Smart plays are rewarded with both bonus points and the opportunity to consult the Oracle that lurks within the game.





EYESORE VS. EYE PROTECTION

As today's monitors get bigger and brighter, anti-glare filters become less of an option and more of a necessity.

The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

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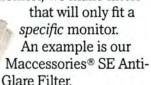
In fact, most filters look like they belong to someone else's system.

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REVIEWS

multiperson modes, a mode in which you play against the computer, and a spectator mode in which you watch two computer players compete. There's also an option in which the computer plays with you, pointing out all legal moves in advance (speeding up game play), as well as an Oracle that politely notes your attempts to make illegal moves and offers

s a strategy game, Ishido is flawless; but if you don't eat caviar for breakfast, a nonlimited edition is in the works.

you various ways to cheat legally (which it lets you do, at the expense of losing the right to be listed in the high-score hall of fame).

Underlying all these options is the true meaning of Ishido: an I Ching-based guide to the meaning of life — your life, specifically. You can enable and disable this fortune-telling aspect of the game, in which high scores are rewarded by insights and answers to your innermost questions.

THE BOTTOM LINE As a top-drawer (albeit a pricey drawer) strategy game, Ishido is flawless. But wonderful as the game is, I'm left with one unanswered question for the Ishido Oracle: When will the *unlimited* edition, priced for the masses, be available? The idea of a limited run may work as a marketing gimmick, but for those left out, it hardly seems like fair play.

— Jon Zilber

Get Info

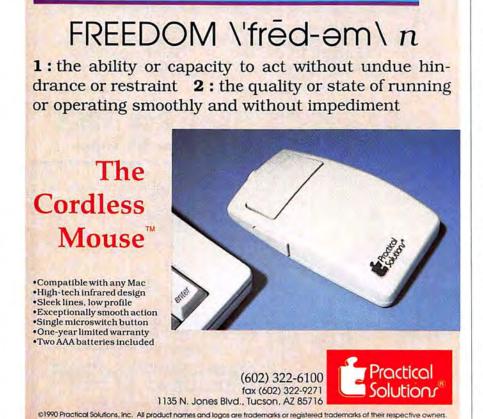
Ishido \$\$\$\$\$

Published by: Publishing International, 333 W. El Camino Real, Suite 222, Sunnyvale, CA 94087; (408) 738-4311. List Price: \$495.



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Start Up

WORD PROCESSING

Spelling Coach Professional

The Godzilla of spelling checkers just got bigger and more powerful.

Spelling Coach Professional 3.1 easily retains its title as the giant among spelling checkers. It takes four (count 'em!) 800K floppy disks just to hold all its files. But contained within those files is a collection of features that is unmatched by any other current competitor.

NEW AND IMPROVED The major new features of version 3.1 include a redesigned Control Panel (with improved auto-open options), clearer dialog boxes, greater flexibility in hot-key assignments, and — most significantly — Deneba's Big Thesaurus (formerly a separate utility, it is now integrated into Coach). The thesaurus is the best I have ever seen on a computer and is — all by itself — almost enough reason to get Coach. Coach also includes three separate utilities for adding sets of legal, medical, and (new in this version) technical words to the main dictionary.

Coach remains a combined DA and cdev. It either checks words interactively (as you type) or batch-checks an entire document. The new version also offers full compatibility with almost all current word processors, including Word 4.0 and MacWrite II, and can even be used interactively with PageMaker.

In addition to its expanded thesaurus, Coach retains its "concise definitions" files, giving it almost all the features of a printed dictionary. (If you need to save disk space, the thesaurus and definitions files are optional.) And of course, there is the Merriam-Webster dictionary — which the program uses to flag grammatical mistakes (misplaced capitals, double



Spelling Coach Professional is the biggest spelling checker you can buy. This is Coach's Analysis window, which is used during batch checks. Each of the nine icons along the left side of the window is an active button (but good luck trying to guess their functions).

words, and the like) as well as spelling errors.

The interactive checking mode is convenient to use and generally very fast. A minor complaint is that the pop-up menu does not provide an option that lets you type in corrections. In batch-check mode, an Analysis window is available that lists all the suspected misspelled words. From here, you can (among other things) quickly indicate all the words you want Coach to ignore. Ignored words are remembered for the duration of a session, so that subsequent checks do not flag them again. On the negative side, Coach conducts its batch check via the search-and-replace functions of the active application rather than its own. This can be awkward and occasionally leads to unintended abortion of checks.

NEW AND WORSE My major complaint about Coach is that, for what should be a simple utility, it's not designed to be easy to learn. Coach depends heavily upon hot-key commands for many actions, yet it provides no easily accessible listing of what functions are performed by certain commands. Unless you read the manual carefully, you may not even be aware that some functions exist. Similarly, Coach's displays (particularly the Analysis window) use buttons labeled only by an (often cryptic) icon. It would have been far preferable to have the name of the button pop up when you clicked on it. As it is, too much memorization is required before you are comfortable using Coach.

In comparing Coach with Thunder II the other leading interactive spelling

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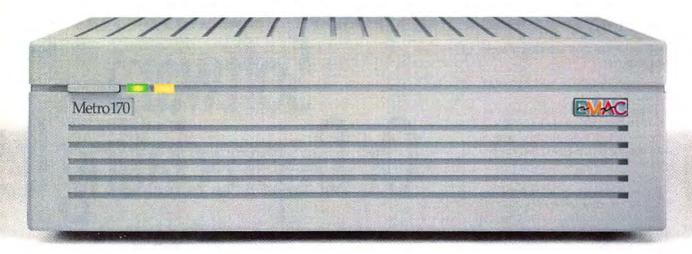
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REVIEWS

checker—Coach's biggest missing feature is a glossary function. Thunder II also scores points with its much smaller size and overall more intuitive interface. But Coach contains the thesaurus, concise definitions, and specialized dictionaries.

Coach was significantly slower in a

Coach is the closest thing to a complete dictionary for the Mac.

one-page batch check than either Thunder II or the spelling checker included with MacWrite II. However, Coach slowed down the most when searching for words that were spelled correctly but not in its dictionary. I could have saved considerable time by pressing the Option key to halt these searches, but I didn't because I couldn't do that with the other programs. On the plus side, Coach does the best job of correctly identifying all the errors, but it doesn't tend to find the correct alternative to words with misspellings near the beginning of the word (it never suggested checker as an alternative to ckecker, for example).

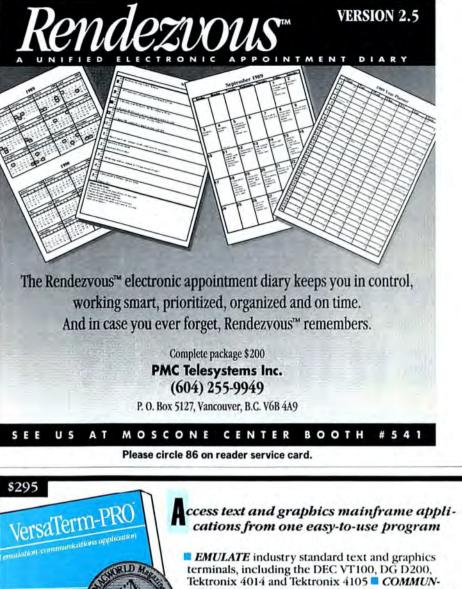
Many users will remain content with their word-processing program's built-in spelling checker. But if you are among those looking for something better, and especially if having on-line access to definitions and a superior thesaurus appeals to you, then consider getting Coach. It's the closest thing to a complete dictionary currently available for the Mac.

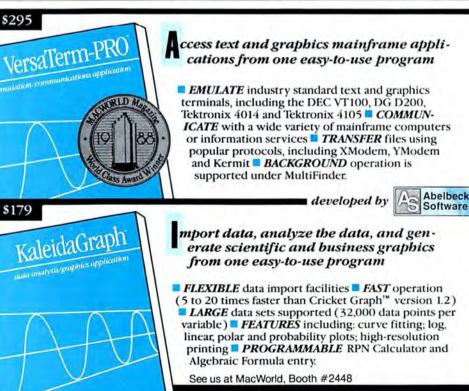
— Ted Landau

Get Info

Spelling Coach Professional ***

Published by: Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122; (800) 622-6827. Version: 3.1. List Price: \$195.





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Start Up

HYPERCARD

HyperBASIC

HyperBASIC has a long way to go before becoming the XCMD compiler of choice.

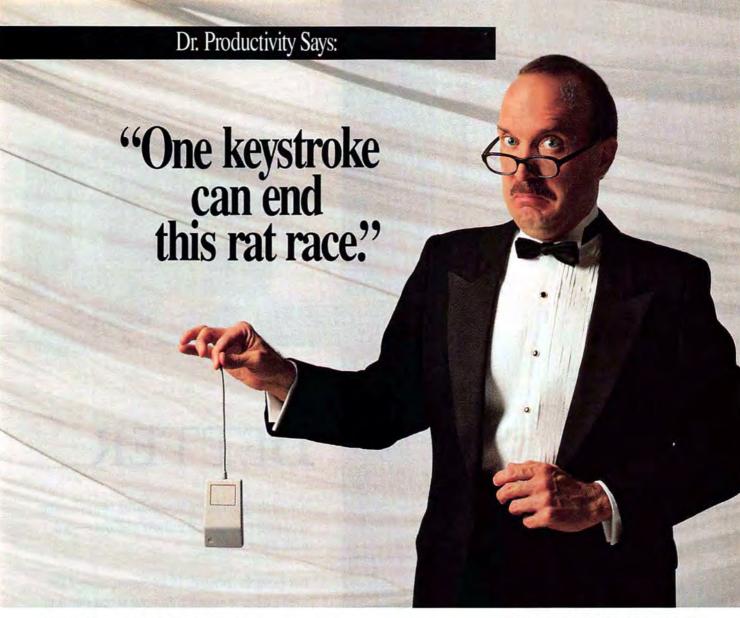
TKS HyperCard has a powerful feature called language extensibility. The developers of HyperCard realized that they could not anticipate all the commands a HyperTalk programmer would ever want to use, so they created a broad general set of commands and built in the ability to extend HyperTalk with external commands (XCMDs) and external functions (XFCNs).

XCMDs and XFCNs have traditionally been built with Mac development languages such as C or Pascal. Unfortunately, many serious HyperTalk programmers balk at the burden of learning a new complex programming language and development environment just to be able to create their own XCMDs. HyperBASIC is aimed at the programmers who want the gain without the pain.

BASIC TRAINING HyperBASIC is a standalone XCMD-compiler application. You write XCMDs in the BASIC language instead of in C or Pascal. Teknosys picked BASIC because it felt that most people have had exposure to BASIC in school and that, like HyperTalk, BASIC is a friendly, easily approachable language.

The BASIC compiler for Hyper-BASIC is typical of modern BASIC languages in that it supports If/Then/ Else, While/Wend, and Case statements as well as line labels. It supports different number bases and the following standard mathematical functions: sine, cosine, tangent, exponentiation, log, and square root. HyperBASIC includes BASIC's powerful string-handling commands as well as ten-dimensional arrays. For programmers who want to take full advantage of the Mac Toolbox, HyperBASIC provides access to 352 Toolbox traps.

HyperBASIC also supports interaction with HyperCard through a series of 11 HyperCard callbacks that allow you to get or set the contents of any card or background field, get or set global variables, send HyperCard commands to



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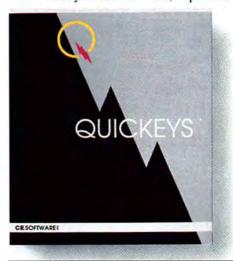


"MacUser gave QuicKeys a four-mouse rating and an Editor's Choice Award. Robert

Wiggins, of *MacUser*; says 'It could send your mouse to retirement.' *MacWorld* named QuicKeys as one of the Goodies You Can't Be Without. *MacGuide* readers awarded it the Golden Gavel. *Byte* says, 'QuicKeys is right up there with sliced bread, the Great Pyramid of Cheops, and other wonders.' The raves go on and on."

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Start Up

the current card, or evaluate HyperTalk expressions.

HyperBASIC has a simple but functional text-editing environment. When you finish writing an XCMD program, HyperBASIC checks the syntax and marks the locations where it encountered errors. When your XCMD passes the syntax check, you compile the code; HyperBASIC creates the XCMD and installs it in any HyperCard stack you choose.

SUBBASIC The idea behind Hyper-BASIC is a good one, because it makes sense to have a straightforward XCMD builder that uses a language most people know. There are a couple of glaring problems, however.

HyperBASIC's debugging capabilities are almost nonexistent unless you want to work at the assembly-language level. And HyperBASIC is simply an XCMD compiler, not a full-blown BASIC development environment. So once you've created an XCMD, you have to switch to a HyperCard stack to try it out. If it doesn't work, you have to go back to HyperBASIC for another rewrite.

The biggest problem, however, is the manual. The value of using BASIC is that it is easy and friendly. The HyperBASIC manual, unfortunately, looks as if it was written by a C programmer on drugs. It is unforgivably complex, jargony, and dense. In addition, the examples are frequently undocumented and not particularly illustrative.

THE BOTTOM LINE If you don't want to go to the trouble of learning MPW or C in order to create XCMDs, HyperBASIC is a much simpler way to go. The manual may frustrate you and slow your progress, but Teknosys promises that a new manual is being written. This will go a long way toward making HyperBASIC the XCMD builder for the masses.

- Howard Bornstein

Get Info

HyperBASIC

Published by: Teknosys, 3923 Coconut Palm Drive, Suite 111, Tampa, FL 33619; (813) 620-3494. Version: 1.05.

Version: 1.05. List Price: \$99.



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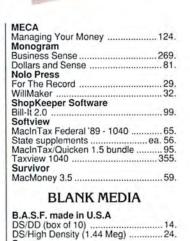
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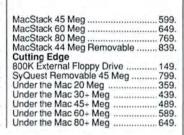
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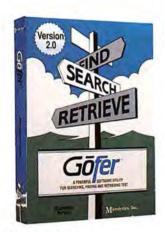
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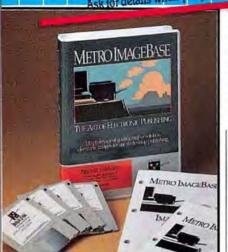
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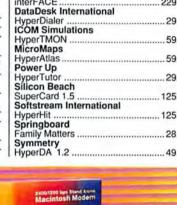
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ules into a single unit. Additionally, the Switchboard is the first keyboard that is en-gineered to work on both IBM and Apple computers. (input/output) Call.

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in non-volatile memory. Includes software and cable. (modems) \$145.

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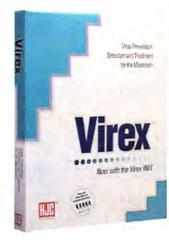


HyperDialer (DataDesk International) Now you can connect your Macintosh to your existing business or home telephone for automatic dialing with Apple's HyperCard. Databesk's HyperDialer is designed specifically for HyperCard's touch-tone dialing capabilities and works with-line business phones without requir-ing a modern or dedicated phone line for auto-matic dialing. Automatically dials HyperCard, SideRick, Focal Point, C.A.T., SuperCard and QuickDex phone numbers. It connects to Mac's speaker port - not a precious serial port. (hyperware) \$29.

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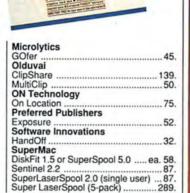
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XTreeMac (XTree Company)

A cluttered desktop is no longer a sign of genius! Smart Mac users employ XTreeMac to effectively find, organize or even launch files from a single window. Utilize
XTreeMac's unique Deskpad to
gather files, folders and applications
from multiple disks then neatly display them in a graphical Directory Tree. But don't budge yet! You can use either loca-tion to copy, move, rename, delete or even launch your applications. A sophisticated Undelete function comes in handy when you empty the trash too quickly. (utility) \$52.

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TreeMac



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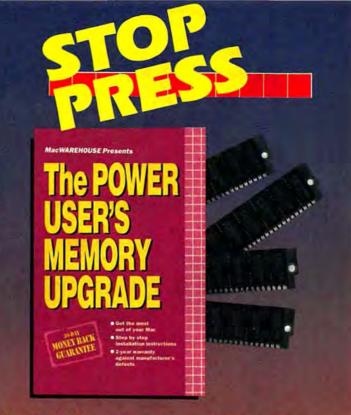
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GRAPHICS

StrataVISION 3d

StrataVISION 3d brings mainframe rendering power to the Mac, provided you have the RAM — and the patience.

StrataVISION 3d is a modeling and visualization tool for the Mac II family that can create photorealistic 3-D images that were previously available only with a mainframe. Finished scenes look like snapshots of real-world objects in real-world lighting, but because a Mac isn't a mainframe, rendering can be excruciatingly slow.

TOOLS OF THE TRADE Strata VISION uses tools similar to those in Super 3D, Pro3D, Zing, and Swivel 3D, so its interface soon becomes familiar. You create wire-frame produce a simple pyramid in one step. Moreover, you can't lathe an object less than a full 360 degrees. Also absent is a numerical way to set or display an object's dimensions — it's all done by cychalling. You can, however, import precisely dimensioned 3-D models in DXF format from CAD applications. The program also imports MiniCAD files that have been converted to a "3-D mesh" format.

StrataVISION can also form ex-

trudable or lathable outlines by automatically tracing any pasted bit map. Black or dark areas define solid matter, and any enclosed white space becomes a hole. Unfortunately, you can't

reshape objects or outlines by repositioning vertices; editing is limited to resizing an object along any of its axes.

StrataVISION can also trace text. If you have ATM installed, it should let you create smooth text at any size.

You can create reusable elements on the fly by saving any existing object as a named part or by drawing a new object in a separate window. Once you've created them, you can access your creations through a hierarchical menu.

Picking elements from a menu saves both time and memory when you need many duplicates of the same object in one drawing, because object copies don't take as much space as their originals. This approach is a powerful tool in that you can alter the attributes of one master part and all its copies in the model will update appropriately.

Objects have six handles that can be used for resizing or rotation. Resizing works as it does in any drawing program. In rotation mode, the corner and side handles spin the object on the x-, y-, or

z-axis. There are no alignment tools except for a customizable grid, and there's no numerical object positioning or orientation. You navigate through a 3-D world by using a logical set of handles for orbiting your viewpoint along the three axes and by employing tools for altering the degree of perspective, distance, and magnification — all by eye.

With Strata VISION you achieve realworld appearance by applying qualities, such as natural color and texture, to the

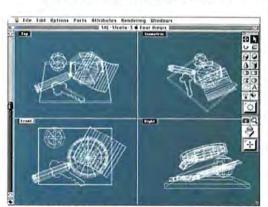
belier mg. son sees y m. son s

StrataVISION 3d rendered this 5-x-7-inch snapshot, with most options on, in about six hours, using otherwise idle time. Fortunately, while rendering is in progress, you can use some nonprocessing-intensive DAs — such as Acta — to stay productive.

otherwise plain-colored 3-D solids in your space, mostly by wrapping bit maps around solid objects. One bit map can be used for color-texturing the surface, another for adding bumpiness, and another for applying variable transparency. There are several other types of bitmapped effects for even more realism. These bit-map-applied qualities combine with a host of base qualities you set for an object — transparency, index of refraction, reflectivity, and more. Once you've created a group of qualities, you can save it as a named attribute, which becomes available from a menu.

Any number and mixture of global, spot, and point-source lights can illuminate an object. The spot and point-source lights work like lamps: You place and point them as you see fit. Global lights point inward from infinity toward the center of the world. You position them by dragging them to anywhere in the universal sphere.

slow: RENDERING AT WORK Rendering a snapshot is a complex imaging process that can take considerable time and/or disk space. Your available RAM can limit the size and number of bit maps you



StrataVISION 3d brings mainframe rendering power to the Mac II — albeit slowly. Its 4-view mode shows you isometric, top, front, and side views, but you can set and tweak each viewing plane to another view and manipulate objects in any of them.

shapes, assign them qualities, and then render any area of your 3-D space. Your final product is a 32-bit snapshot that you can save in either PICT2 or TIFF format.

Your working view is a wire-frame. The sphere, cylinder, cone, and cube have dedicated tools. Other 3-D shapes begin with a 2-D outline that you trace with familiar drawing tools and then extrude or spin to define a solid. Built-in-object creation is somewhat limited. You can't control the precise number of lathed facets, so there's no way, for example, to

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Start Up

can use (2 megabytes are required; 5 are recommended). The basic rendering modes are line drawing, gray scale, and full color. Options include surface smoothing (defaceting), smooth edges (anti-aliasing), shadows, transparency, reflectivity (ray-tracing), refraction, and surface mapping. Rendering options can be saved, and reused, as named sets. Objects' attributes are rendered only if you switch on the related options, so you can speed things up by being selective. The larger your snapshot, the longer it takes, but the final product can be spectacular.

StrataVISION's 2.0 release — slated for the second quarter of 1990 - will provide a projected 400% improvement in rendering speed. Version 2.0 will also sport numerical precision with numerical feedback, rulers, a snap-to grid, plus metric and English measurement units. A key-frame-animation utility called StrataFlight will enable you to save key frames arranged on a time line and will automatically render and optionally assemble them into a PICS document. New shaping powers will include the Bezier curve and fully editable vertices in both 2-D and 3-D. Lathing will be possible to any degree, and you will be able to specify the number of facets. Version 2.0 will also import PICT objects for extrusion and lathing.

THE BOTTOM LINE StrataVISION 3d is inexpensive and capable enough to justify the cost of a Mac II accelerator — or a IIci — which can drastically cut rendering time. This version needs a healthy dose of precision options. To make full use of it, you'll need a color painting program and possibly a scanner so you can provide those all-important bit maps. StrataVISION gives you mainframe rendering power on a budget, although its current performance limitations may make it less of a bargain than it first appears.

Salvatore Parascandolo

Get Info

StrataVISION \$\$\$\$

Published by: Strata, Inc., 249 E. Tabernacle, Suite 201, St. George, UT 84770; (801) 628-5218. Version: 1.03.

Version: 1.03. List Price: \$495. UTILITIES

Advanced Security, DiskLock, FileGuard

If you're security conscious, you now have three more weapons.

As the Mac has insinuated itself into corporate settings, security products have proliferated at a breakneck speed. Three recent arrivals include major upgrades to already existing programs (Advanced Security and FileGuard) as well as a brandnew piece of software called DiskLock, from Fifth Generation.

THE LINEUP Advanced Security (origi-

nally InfoGuard) actually includes three programs: File Security for file encryption, HD Security for locking up hard disks, and Virus Security.

DiskLock provides security as a DA by allowing you to limit access to or lock hard disks. It can also encrypt files. The software runs viral self-checks each time it's used, which offers some protection against infection.

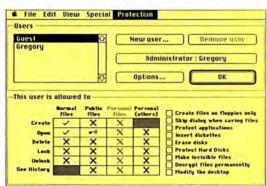
FileGuard offers the most impressive array of security features among this batch of products. It provides varying access levels, both to software and hardware, automatic encryption and decryption, application copy protection, and administrator

functions. Best of all, FileGuard works almost entirely in the background. All three products boast transparency — a hot concept in desktop security — but only FileGuard really delivers on that promise in its implementation.

Advanced Security

Advanced Security 1.2 is composed of three applications. File Security performs encryption using DES (a government standard), Alcrypt (a proprietary method), or a simple password to limit file access. You can make files invisible and locked, use session passwords, or batch-process files. The program can automatically sign out of a

session and encrypt open files. You open encrypted files by double-clicking and entering a password. File Security also sports a Master Password feature that can extract passwords from files and an event log that keeps track of file access. The program's most admirable feature is its ability to create "encryptograms." These encrypted files can decrypt themselves,



FileGuard's sleek, user-friendly interface lets different users be assigned different access levels. It works in the background, packs many features that should appeal to business users, and is highly recommended.

so you can send them to people who don't have Advanced Security and who can open them with a password. File Security also lets you lock floppy drives.

The second component of Advanced Security is HD Security. This program locks hard disks so that you must insert a special bootable floppy whenever you start the Mac to get the hard-disk volume to mount. Although effective, this kind of protection terrifies me. If the floppy goes bad or is misplaced or stolen, you're sunk

The third application, Virus Security, is a program that simply checks itself for changes whenever it is run. It is not a particularly robust form of virus protection,

Start Up

because it doesn't check anything else and some viruses specifically target items such as the Desktop file, which Virus Security wouldn't detect.

DiskLock

DiskLock 1.0.1 comprises two programs: an INIT and a program called FolderLock. You access DiskLock's features through a DA.

DiskLock provides automatic harddisk locking at shutdown and requires that users sign in when the drive is first booted. You can set the drive to be locked when idle, and the program compiles a log that traces disk activity. A utility called Emergency Unlock is always ready, just in case the DiskLock password dialog box doesn't appear when you first boot the drive.

You use FolderLock (also accessed through the DA) to encrypt files, singly or in batches. You can set the program to automatically reencrypt any open protected files on shutdown, and there is provision for a fail-safe master password. The program uses a proprietary form of encryption. DES is not supported.

Get Info

Advanced Security

Published by: Advanced Gravis Computer Technology, Suite D12, 1602 Carolina St., Bellingham, WA 98226; (800) 937-0062 or (604) 434-7274.

Version: 1.2.

List Price: Single-user version, \$149.95; multiuser versions available.

DiskLock \$\$\$\frac{1}{2}\$

Published by: Fifth Generation Systems, 11200 Industriplex Blvd., Baton Rouge, LA 70809-4112; (504) 291-7221. Version: 1.0.1.

List Price: \$189.

FileGuard ***

Published by: ASD Software, 4650 Arrow Highway G-21, Montclair, CA 91763; (714) 271-9913.

Version: 2.0.2. List Price: \$249.

FileGuard

FileGuard 2.0.2 differs from the first two programs in that it is a cdev that operates to a large extent in the background. It adds a special menu called Protection to the menu bar in every application.

FileGuard provides an added dimension to file and disk access by allowing you to define varying levels of access in a user list. A guest, for example, might be forbidden to insert floppies. Another user might be authorized to encrypt and decrypt personal files—or even delete files—but could do so only to documents on floppy disks. The key is that every user must log in with an assigned name and password when first using the computer. This approach requires some preparation and an administrator responsible for maintaining the user list and assigning passwords.

In terms of encryption, FileGuard automatically asks if you want to encrypt a file when you first save it from within the creating program. There is no need to start up an encryption program and then process files (except for files created before you installed FileGuard). Files can also be locked or made invisible. FileGuard does not support DES. You open encrypted files by double-clicking and entering a password. The program maintains a detailed user log for each file.

In addition to file and drive protection, FileGuard boasts a unique feature: It can protect applications. Protected applications can be made to run only on your hard disk, which prevents people from stealing software. You can also create software demos that will function for a specified period of time or for a fixed number of launches. FileGuard also provides support for magnetic-card readers.

THE BOTTOM LINE Putting bytes behind bars is big business these days. Of the current crop of programs designed to patrol our computers, FileGuard stands out, especially for corporate users. Being able to assign different user access levels makes it an ideal business tool. Unlike Advanced Security and DiskLock, however, FileGuard does require an administrator to keep the user names, passwords, and security levels straight, but that should be a small price to pay. FileGuard comes highly recommended. Of the other two programs examined here, Advanced Security's somewhat lower price and additional features make it the better buy.

- Gregory Wasson

CAD

Ashlar Vellum

By introducing elements of artificial intelligence, Ashlar has launched a new era in CAD.

Originally vellum was parchment made from the skin of unborn lambs. Today, vellum is translucent smooth-surfaced paper used for engineering drawings. Soon Vellum will also mean "design and drafting software that thinks." With so many look-alike Mac CAD programs available, any product entering that market needs something unique, Vellum has Drafting Assistant, a geometric inference engine that applies artificial-intelligence concepts to the electronic drawing board.

Ashlar claims that conventional CAD programs often don't save much time compared with a pen and T square. In fact, a skilled drafter can frequently create a drawing faster by hand than on a computer. And the evolution of CAD systems constantly adds more features and functions, to the detriment of easy learning and efficient use.

Vellum, in contrast, opens to an uncluttered screen. Its power is hidden behind a lean, mean user interface. The drawing palette has only 12 basic tools, and the menu bar adds only six pull-down menus to the standard Apple, File, and Edit menus. Most tools have several pull-out options; the line tool, for example, switches among single-, connected-, and parallel-line modes.

HIGH-IQ CAD Drafting Assistant provides continuous feedback about the precise location of the cursor as it moves around the screen or snaps from one geometric feature to another. This would be almost unworkable if the cursor were just a single pixel, but the active radius is 12 pixels. You can set a different size or turn off the Drafting Assistant entirely by setting a zero radius.

When you move the cursor near a line,

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DataLink/MacTM (left), the ultimate internal modem for all Mac II's, includes a "Mac standard" serial port allowing for the addition of extra peripherals even when the built-in ports are occupied. Upgradeable to MNP-5 and send-fax.

DataLink ExpressTM (center), is a smart choice for compact Macs and for Mac II owners who prefer an external. Its exclusive Line Engaged indicator warns if the modem line is already in use. And since DataLink Express is compatible with any computer (w/serial port), we included both mini-8 and DB-25 ports standard. Options include MNP-5 and send fax.

DataLink/Mac PortableTM(right) was designed for low power operation in the new Mac Portable to extend the life of the computer's battery. MNP-5 and send-fax are standard.

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Up to Date

Changes New and Noted

ADOBE TYPE MANAGER has had its first upgrade, to version 1.2. The improvements include better spacing when printing from programs that don't support fractional character widths, more easily distinguished bold characters (especially at smaller point sizes), support for Bitstream Type 1 fonts, better performance in large point sizes, and a banner-printing application for use on ImageWriters. Registered ATM owners can get the update free, as well as an added benefit: the option to purchase any one of the 128 Adobe Type Library packages for \$39 (plus \$7.50 shipping and handling), which is a substantial savings the highest-priced package normally sells for more than \$300. Ordering information for the upgrade and font offer will be sent automatically to registered owners. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900; (415) 961-4400. Version 1.2. \$99.

DATABASE, the handy flat-file manager in a DA, has been upgraded to version 1.5. A new file format reportedly improves the program's speed significantly. New features include searching and sorting records by date, support for international date formats, and a phone dialer, and the number of records per file is limited only by disk space. The upgrade fee is \$15 to registered owners or free if purchased after November 15, 1989. Preferred Publishers, 5100 Poplar Ave., Suite 706, Memphis, TN 38137; (800) 446-6393 or (901) 683-3383. Version 1.5. \$129.95.

WRITENOW, version 2.2, now includes the WordMaster 1.4-million-word thesaurus; a 135,000-word dictionary; compatibility with Microsoft Word 4.0, 3.0, and Write; Format Accelerators that make globally or selectively changing font/size/style easy with just a special cut and paste; direct entry of font sizes; a Window Clean Up function with stacking and tiling options; and Control Panel date formatting for use with any application. The upgrade is \$39 for registered users and free if version 2.0 was bought after February 1, 1990. T/Maker Co., 1390 Villa St., Mountain View, CA 94041; (415) 962-0195. Version 2.2. \$195.

a small message attached to the pointer informs you when you reach the midpoint, end point, and so on. As you construct new geometry, the program constantly analyzes the relationships that emerge, and the cursor provides a running commentary on your position: identifying a tangent or perpendicular, for example. The program spontaneously generates dotted construction lines that run completely across the screen, with labels to clarify these relationships.

Vellum provides a tear-off palette of dimensioning tools with many options. Conventions for dimensions and tolerances on drawings differ widely among industries, professions, and countries, so a menu option lets you easily create geometric dimension and tolerance blocks with special symbols.

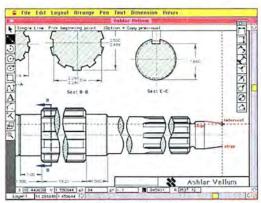
tolerance blocks with special symbols. Vellum's dimensions are associative: When you change an object, its dimensions are automatically updated. You can also make dimensions parametric by typing in variable names instead of numbers. You can then assign values to the variables, and the program automatically redraws your model. Vellum includes a library of parametric symbols such as fasteners and holes to import directly into your own drawings and resize to your own specifications.

what you get The package includes four disks, three manuals, a pocket-sized quick-reference card, and supporting material. The automated Installer took less than five minutes to install the huge program on my IIcx, and I never had to open a manual.

With a list price of \$995, this is not a package for the casual draftsman. Vellum demands serious hardware resources: at least 4 megabytes of RAM, 4 or 5 megabytes of hard-disk space, and a Mac II series or SE/30 CPU. The program is designed to output to a LaserWriter or a plotter (Vellum automatically installs its own Chooser-selectable plotter driver in your System Folder), but I even got good results printing one-page drawings on an ImageWriter II.

WHAT'S MISSING The program includes a translator for importing or exporting DXF files (the format used by AutoCAD drawings) as well as PICT and ASCII text files but not for the widely used IGES format

Vellum has no on-line help feature,



Vellum combines CAD with elements of artificial intelligence. The Drafting Assistant tells you when the cursor reaches significant points in your drawing, such as the intersect and align points shown here. The floating palette in the upper right contains the dimensioning tools.

and even the clearly written 116-page tutorial does not cover every feature of this complex package.

Unlike MacDraw II or Claris CAD, Vellum provides no bit-mapped pattern fills for objects, relying instead on the intelligent application of a few standard cross-hatching patterns. Any enclosed area can be crosshatched, and the crosshatching is automatically updated if you change dimensions.

Ashlar plans to release Vellum 3-D as an add-on module in the third quarter of 1990. This will allow the creation of 3-D wire-frame (but not solid) models. Vellum's internal database is already designed to accommodate 3-D objects.

THE BOTTOM LINE Vellum is a revolutionary entry in a market dominated by evolutionary products. Claris CAD, for example, evolved from MacDraw, and IDD's Dreams is derived from MacDraft. High-end Mac CAD programs (Auto-CAD, VersaCad, MacBravo) are often based on successful minicomputer or MS-DOS products. Users who are familiar with these programs — or anyone who is

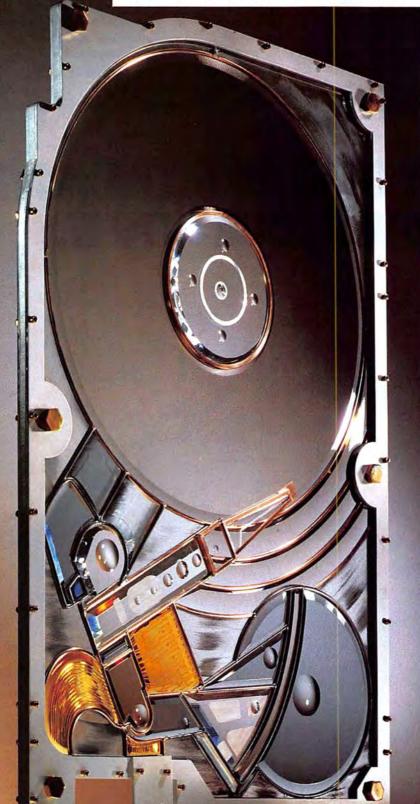
Get Info

Ashlar Vellum \$\$\$\$\frac{1}{2}\$

Published by: Ashlar, 1290 Oakmead Parkway, Suite 218, Sunnyvale, CA 94086; (408) 746-2980.

Version: 1.0. List Price: \$995.

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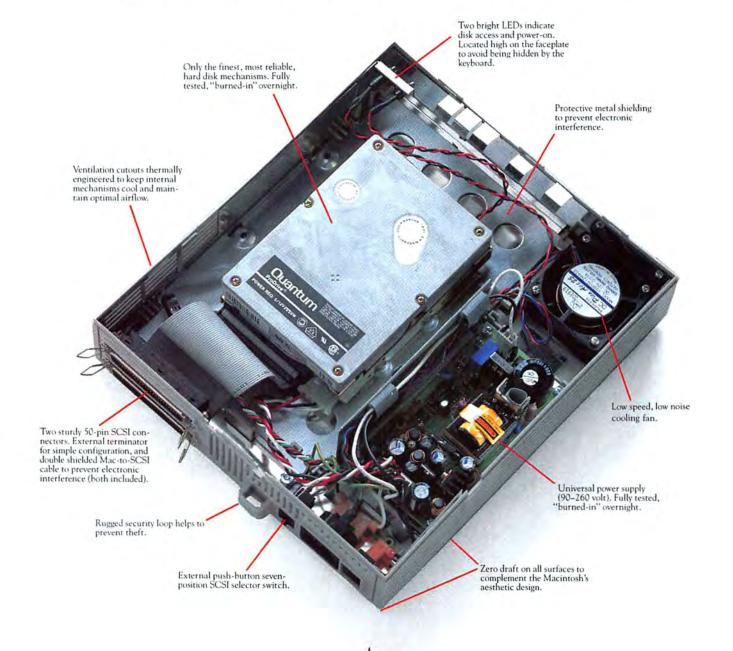
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Start Up

familiar with the Mac interface — should have no difficulty becoming proficient with Vellum.

But Vellum may find its greatest success with two additional groups of users. The first group is experienced draftsmen who have resisted going over to computers because they "can do it faster by hand." Because Vellum "thinks" like a draftsman, these highly skilled and very valuable personnel may find that they can finally do it faster on a computer.

The second group is composed of engineers and technical personnel who are *not* proficient in conventional drafting methods or who never learned mechanical drawing in school. Vellum may actually help compensate for some shortcomings in training or experience. Smart software such as Vellum may ultimately lead to smarter users.

- Mike Markowitz

PRINTERS

QMS-PS 820 turbo

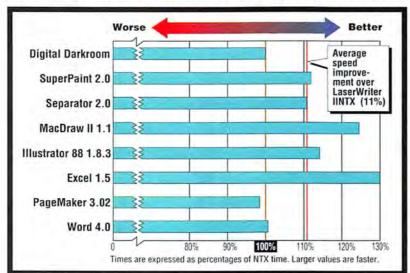
The QMS-PS 820 turbo isn't much cheaper than Apple's LaserWriter IINTX, but it is faster.

QMS historically has produced PostScript printers that are comparable in features and output quality to Apple's LaserWriters (QMS uses the same Canon engines that Apple does), perform slightly faster, and cost slightly less. The new QMS-PS 820 turbo continues this tradition. The PS 820 turbo contains a Canon TX engine, nearly identical to the SX of Apple's LaserWriter IINTX, and thus the output quality of the two printers is the same. Both have a controller based on a Motorola 68020. Both can support a dedicated SCSI hard drive for improved performance with large font libraries. And,

true to historical form, the PS 820 turbo performs slightly faster than the NTX.

BEYOND THE NTX The 820 turbo contains two paper trays, each of which can hold up to 200 sheets of paper, whereas the NTX has only one tray. Despite the extra paper tray, the 820 turbo still lists for slightly less than the NTX — \$4 less, to be precise. (For \$1,000 less, you can opt for the 810 turbo, which is similar to the 820 turbo in every aspect but one — it has only a single paper tray.)

When MacUser Labs tested the 820 turbo, we found it an admirable performer. On the average, it churned out printed



The QMS-PS 820 turbo outperforms Apple's LaserWriter IINTX by 11 percent on the average. The most dramatic advantage can be seen when printing files from graphics applications or from Excel.

pages 11 percent faster than the NTX. although results varied depending on the type of file we printed (see chart). With our Word, Digital Darkroom, and Page-Maker test files, we found no significant difference in performance between Apple's NTX and the 820 turbo. With most graphics applications (Illustrator 88, MacDraw II, Adobe Separator 2.0, and SuperPaint 2.0), the 820 turbo outperformed the NTX by 11 to 24 percent. And the 820 turbo printed an Excel 1.5 spreadsheet a whopping 30 percent faster. (For a complete description of the tests, see our PostScript-printer lab report, "Fit to Print," September '89.)

We also tested the font-caching feature of both printers, using Adobe's Font Folio as a dedicated font disk. When a PostScript printer images type, it stores the most recently imaged characters in a cache, either in printer RAM or on a dedicated external hard-disk drive. Cached characters can be printed much more quickly than uncached characters. Our font-cache test file contains about 900 different characters, with no repetitions. While the 820 turbo printed this file 21 percent faster than the NTX when no characters were cached (2:34 minutes for the 820 turbo vs. 3:16 minutes for the NTX), the two printers performed identically, both averaging around 30 seconds, with all characters cached on-disk.

TURBOCHARGING THE TURBO If you're a serious font user, attaching an external hard-disk drive to your printer will add years of productive time to your life, time you would otherwise spend waiting for your pages to print. QMS provides utilities for working with an attached harddisk drive, but - sad to say - the documentation for this feature is pretty bad. For one thing, it doesn't adequately explain the benefits of using a drive, which users should invest in one, or how best to take advantage of one. Also, it mentions the importance of LaserWriter and LaserPrep 6.0 to font-intensive work only once - buried in a ReadMe file.

LaserWriter/LaserPrep 6.0 (and Print-Monitor 1.3) ship on the Apple Color Disk, along with 32-bit QuickDraw. They do *not* ship with Macintosh system software. But anyone who prints to a printer with a font disk should *absolutely* be using these newer drivers. QMS provides them on the utility disks that come with the 820 turbo but doesn't stress their importance.

QMS provides a Dual Tray DA to

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Start Up

REVIEWS

make it easy to use the 820 turbo's two paper trays. Most applications don't support dual-tray machines, because Apple's standard Page Setup dialog box doesn't. The Dual Tray DA lets you select onetray-only explicitly (if, for example, you have letter-sized paper in one tray and legal-sized in the other). Or you can use



The QMS-PS 820 turbo uses a Canon TX engine nearly identical to the SX engine in Apple's LaserWriter IINTX. With similar output quality, the QMS is slightly faster than the NTX.

the DA to "chain" the two trays: When one runs out, the printer automatically switches to the other. A terrific idea, but unfortunately this utility is marred by a serious bug that renders it inoperable on complex AppleTalk networks. QMS is working on squashing the bug and expects a fix to be ready by summer 1990.

THE BOTTOM LINE You might think, from all these complaints, that I don't think the 820 turbo is a good printer. On the contrary: I think it's a very good printer, but I'd like to see it be a great printer. Until then, I highly recommend it to those shopping for a PostScript printer. With the QMS-PS 820 turbo, you get the same output quality as with Apple's Laser-Writer IINTX, for the same price, but you also get dual trays and, in many cases, better performance.

- Henry Bortman

Get Info

QMS-PS 820 turbo

Manufactured by: QMS, Electronic Publishing Group, One Magnum Pass, Mobile, AL 36689; (800) 631-2692 ext. 420. List Price: \$6,995.

TELECOMMUNICATIONS

White Knight

The latest version of the late Red Ryder is an even more powerful telecommunications package.

Last year was more than the end of decade—it was the end of an era as well. Red Ryder, the shareware legend, ceased to exist at the end of 1989—the victim of lawyers, licensing fees, and other grinches. Red Ryder had quite a good run, growing from a simple BASIC program into the Swiss army knife of telecommunications software, making it all the way from shareware version 1.0 to the commercial version 10.3 before its demise.

But although the name may be gone,

the soul of the software lives on in White Knight, perhaps the first program to have its first version be numbered 11 (the numbering scheme carries over from Red Ryder). White Knight has the same low overhead and low price as its predecessor, and the plain white manual cover makes White Knight look like generic communications software (although the new colored box somewhat spoils the effect).

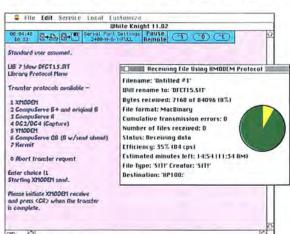
WHAT'S NEW White Knight is a complete rewrite of Red Ryder, with many major changes as well as the

usual bug fixes and minor enhancements. It also comes with an all-new 270-page manual that has two indexes.

The biggest change is the addition of a facility, similar to HyperCard's XCMDs, called RCMD. RCMDs are code resources written in programming languages such as C or Pascal that extend White Knight's capabilities. Several sample RCMDs come with the package, including one that supports CompuServe's Quick B protocol, and more will be available in White Knight's support roundtable on GEnie.

Even if you are not a programmer

capable of creating an RCMD, you'll appreciate White Knight's procedural language, which has been extended to let you create detailed scripts. The Write a Procedure for Me command records your actions, so you don't even have to understand the scripting language to write a procedure. For simpler tasks, White Knight offers macro keys, which can be accessed from a separate window as well as from the status bar and can also be used to invoke procedures and RCMDs. White Knight's Host mode, which lets you use



White Knight is the latest version of the now-defunct Red Ryder. The ability to download status information has been greatly expanded in White Knight, and color support has been added to the previously available font support.

the program as a miniature bulletin-board system for transferring messages and files, has been expanded as well with new commands, three levels of password support, and MultiFinder compatibility.

Among the hundreds of less noticeable changes from and enhancements of Red Ryder, White Knight now supports color and remains one of the only communications programs that supports multiple fonts. White Knight's menus have been rearranged — hierarchical menus now group related commands. You can access submenu items by using a unique method of typing two keys while holding down

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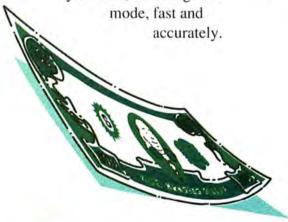
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Programs for the future

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the Command key. The size and position of most windows are now remembered from session to session, and dialog boxes are now centered. Printing support has been improved, throughput has been increased, VT102 emulation has been added, and even MultiFinder support has been improved. White Knight now recognizes all Apple keyboards, so the Install Special Keys utility is necessary only for non-Apple keyboards.

White Knight expands on available file-transfer options as well. Text captures can be appended to existing files, and capturing can be suspended temporarily without closing and reopening of

the captured file.

For protocol transfers, White Knight supports XMODEM (Checksum, CRC.1K, and ack-ahead); YMODEM (standard, 1K, and G); Kermit (standard, long packet, and sliding window); ZMODEM; and Flash, a new high-speed low-overhead protocol for use with error-correcting modems. The Compu-Serve B protocol has been dropped, but the newer Quick B protocol is available as an RCMD. White Knight supports three "filters" for the terminal window, text transfers, and protocol transfers. As characters are received, the filters can pass them through unchanged, strip them out, or remap them to other characters.

As if this weren't enough, programmer Scott Watson has thrown in an extra added attraction, Okyto, for a limited time (the offer may be withdrawn by the time you read this; check with FreeSoft). Okyto is a special-purpose program that has one mission: to talk to other copies of Okyto, either via a modem or over AppleTalk. Like the old shareware program MCS (see Bobker's Dozen, February '90), Okyto lets you send and receive files as well as type conversational messages all at the same time, and you can even look through the directories of the remote system simultaneously (assuming you know the passwords to get access). Okyto

Get Info

White Knight \$\$\$\$\frac{1}{2}\$

Published by: FreeSoft Co., 150 Hickory Drive, Beaver Falls, PA 15010; (412) 846-2700.

Version: 11.02. List Price: \$139. is intended to simplify Mac-to-Mac transfers so you don't need to learn White Knight or experiment with different options to send a file from one Mac to another. You just run Okyto and tell it which files to send or receive. If you have a high-speed (9,600-bps or more) modem, you'll have to use special initialization strings to get Okyto to function, so for those modems it's not quite as easy to

THE BOTTOM LINE White Knight is one of the best values in communications software, and with Okyto thrown in (a \$39.95 value when purchased separately), it's an even better bargain. Yes, White Knight can be confusing and even overwhelming to a novice, but the new manual tries to make it easier to learn, and with Okyto even novices can quickly be sharing files with friends and coworkers. And yes, White Knight's interface is unattractive when compared with its competition, but it is functional and people seem to like the program, warts and all. There are too many satisffed Red Ryder users to ignore, and White Knight continues the tradition of supporting every possible feature that its users could want and then some - and with RCMDs you can add features even Scott Watson couldn't think of.

- Robert R. Wiggins

TYPOGRAPHY

TvpeStyler

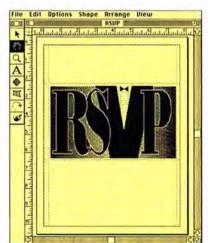
Broderbund's display-type utility is a winner.

Display or decorative type is one of the mainstays of the advertising and publishing industries. Creating it on the Mac has generally required tedious manipulations in draw programs or the use of specialized programs, such as Laser FX and LP Text, that were plagued by clumsy interfaces. LetraStudio was the first type utility to break with this tradition. It allowed users to create and distort decorative type with considerable ease but was restricted to LetraSet fonts.

TypeStyler is the latest player in the type-utility arena. Although LetraSet beat Broderbund to the punch with the release of LetraStudio, TypeStyler promises some stiff competition.

TYPE ON DISPLAY TypeStyler is a vastly improved offshoot of technology pioneered in an earlier Broderbund product, PosterMaker Plus. It comes with ten special outline fonts called SmoothFonts, which are a proprietary font type that TypeStyler uses for its manipulations. TypeStyler also includes a font-conversion command that can change almost any Type 3 or Fontographer font into a SmoothFont (composite fonts based on Adobe originals cannot be converted).

The program has one purpose: to create and manipulate decorative type. It supports 8-bit color and can output files as process-color separations. The program can output to PostScript or Quick-Draw printers. Files can be exported as EPSF, EPSF text, MacPaint, or PICT, You can also save simple text and graphic object outlines (minus any distortions you might have applied) as Illustrator files.



TypeStyler is a good utility for creating display type. Its main window should look familiar to users of page-layout programs. Tools include pointer, grabber, magnifying glass, text, graphic object or panel, shaper (for distorting styled text), rotate, and screen refresh.

TypeStyler's main window comes with rulers that can be set to inches, centimeters, picas, or points. If you need to, you can reset the zero point and drag guides

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Memory Cambridge Z88 Systems for Macintosh users provide up to one megabyte of memory, all available for your data files.

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Peripherals The Cambridge Z88 is only 8.25"x11.5"x.875", but it's a complete computer and can be used with a pocket modem, a serial or parallel printer.

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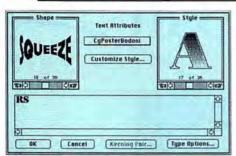
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Start Up

REVIEWS



TypeStyler's work is done in the textattributes dialog box. You type in text and apply shapes, styles, or special effects.

onto the drawing area.

You create styled type by dragging out a box with the text tool. The text-attributes dialog box appears. This is where you type text, choose a font, and apply any of 35 predefined shapes (what Letra-Studio calls envelopes) and 35 styles. The latter elements are TypeStyler's most welcome feature. LetraStudio forces you to create custom effects such as drop shadows. TypeStyler more forthrightly provides them as "styles." You can customize styles with colors, patterns, or special fills (star burst, dual blend, and the like). Type can also be kerned.

Shapes or styles can also be created and applied to basic graphic objects or "panels" through a similar process.

You can align text and graphic objects through sophisticated pasting procedures that let you copy and paste attributes such as font, shape, area, center, and style.

MISSING CHARACTERS Complaints? Some users will miss precise controls over line widths and gray fills: You select these settings from graphic palettes rather than by entering numbers.

The program runs slowly on low-end machines. Here are the times it took TypeStyler to redraw the screen of the

Get Info

TypeStyler \$\$\$\$

Published by: Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101; (800) 521-6263. Version: 1.0.

List Price: \$199.95 (includes ten fonts). Registered owners of PosterMaker Plus can purchase TypeStyler for \$50. Additional fonts available at extra cost. relatively simple "Christmas Carol" graphic shown here: Mac Plus (with SCSI hard-disk drive), 32.8 seconds; SE, 28.7 seconds; SE with Radius Accelerator 25, 10.8 seconds; Mac IIcx, 6.3 seconds.

Simply switching between two styles in the text-attributes dialog box takes 5 to 12 seconds on a Mac Plus or SE. (Type-Styler is not unique in this regard; Letra-Studio can also be painfully slow, even on a Mac IIcx.)

Although using TypeStyler on any system other than a Mac II or a Mac with an accelerator will be unacceptably slow for some users, it's still faster than preparing display type manually — a consideration that speed tests all too often

ignore. You can speed things up by displaying styled text as frames rather than in a fully styled form.

THE BOTTOM LINE Despite the complaints, TypeStyler is a valuable addition to DTP. The program may well become the Page-Maker of type utilities. LetraStudio offers controls that are far more precise than those of TypeStyler. But TypeStyler, I suspect, will win the hearts of desktop publishers as the emotional favorite—as is clearly the case with PageMaker in the page-layout wars.

Broderbund has produced an admirable application. Its ease of use and relatively low cost make it a winner.

— Gregory Wasson



With TypeStyler, even the relatively simple styled text shown here can take a long time to be painted on-screen — it all depends on what kind of Mac you have.

Rumor Manager

Gossip, Guesses, and Goings-On

We're not sure we believe this one, although it's taken the rumor circuit by storm. But remember: You heard it here first.

Several years ago, some R&D hackers put together a large bunch of parts to create an Apple mainframe. This project was noticed by the then-new executive staff and the go-ahead was given to polish the new machine. This super-secret project was started in some unmarked buildings in San Jose. For once, Apple security held — until very recently, little was known about the project.

Recently, some details have come to light. The basic machine is a computer roughly equivalent to an IBM 3090. However, some innovative hardware can be used to parallel several (or many) units, the result being a computer of theoretically infinite computing power.

Several of these units, which are called AppleTrees, are about ready to go on-line. They are expected to reduce Apple's internal dataprocessing costs significantly.

All that is interesting, but there's something more. A January board meeting gave the go-

ahead to the formation of an AppleTree marketing division. Apple thinks so highly of the Tree that it is willing to stake many millions of its surplus cash on challenging IBM in selected areas of the mainframe market.

AppleTree Computers will maintain a physical separation from Apple but will in all other respects just be another operating division. Current plans have AppleTree moving to a large and currently vacant manufacturing facility in South San Jose.

Reportedly, Apple gets first options on half of the first year's production, and the marketing division gets to try to sell half. The big public splash will occur right before the end of Apple's fiscal year (late summer).

Our U.S. Mail address is Rumor Manager, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Our electronic addresses are MacUser (on MCI Mail), 70411,204 (on Compu-Serve), and MacUser.Edit (on AppleLink). No calls, please.

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Flash is Fast

- To send a file, just drop it into a Flash folder and off it goes!
- All file transfers are done in the background, so you never have to wait. Flash works while you do.
- Flash's transfer rate is almost 1MB per minute. Most files are sent in seconds.

Flash is Powerful

- Flash can send and receive any combination of files and folders at the same time.
- → The contents of an entire hard drive can be transferred—while you use both computers!
- → Flash can communicate across any AppleTalk network zones that also have Flash installed.

Flash is Friendly

- Flash is perfectly integrated into the Macintosh desktop environment.
- → Installation is so easy you'll be using Flash in minutes—not just reading about it!
- You can use Flash anytime, from inside any application.
- → Flash tells you when your files arrive, so there's no need to keep checking. But, in case you forget, Flash keeps a record of all file transfers.

Software Requirements

 All Macintoshes on the network must be running System 6.0 or newer.

Hardware You Need

- An AppleTalk compatible network.
- Two or more Macintoshes with a minimum of 1MB of memory.

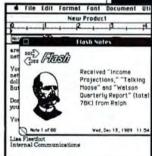
Hardware You Don't Need

- Hard drives not required—Flash works fine on all floppy-based Macintoshes.
- → Dedicated File Server not required—Flash will save you thousands of dollars by keeping all of your Macintoshes free for productive uses.

Only \$199.95!

You can use Flash with any number of Macintoshes in a single AppleTalk network zone. And, you can add as many Macintoshes as you need to each zone at no extra cost. You are not required to purchase more than one Flash program disk unless youse Flash in more than

program disk unless you use Flash in more than one zone. Flash can communicate with any other network zones also using Flash.



Flash tells you when your files arrive.





Chat

Lisa, I got the Watson account figures ready just in time. The boss

Oh no! Flash me those files, will

you? I need a chance to review the before the meeting.

o trouble. See you in the conference

Flash Files

Both people type into

To send files to a

person or group, just drop them in a folder.

the same note pad when

chatting.

wants to get together in 10 minutes!

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The Mac IIfx:

114 May 1990 MacUser

Fast Times at the Apple Computer

A new CPU, a trio of video boards, and a new version of A/UX propel the Mac into the realm of workstation-class speed machines.

By Russell Ito and John Rizzo t's hard to imagine anyone complaining about the Mac IIci's performance, but you'll probably start hearing rumbles of discontent real soon. Apple's first product announcements of the decade represent a huge leap in performance and should put to rest any lingering doubts about the Mac's ability to compete against PC-compatible machines running Windows and Presentation Manager. Collectively, the Macintosh IIfx, three new Macintosh display cards, and a new version of A/UX promise to launch the Mac into entirely new markets. But to really appreciate what Apple has achieved, consider this:

Fact: The Mac is a better windowing environment than the glitziest DOS machine. Even a stock IIcx can outperform a 33-megahertz 80386-based unit running Windows, but because earlier Macs lacked that flashy 33-megahertz clock speed, most users don't realize this.

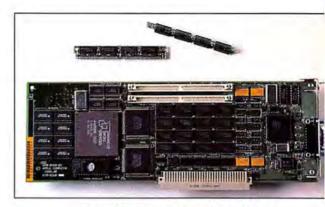
Fact: As the number of displayable colors has spiraled upward, the Mac's display speed has spiraled downward. In 24-bit mode, even simple text documents—without any color—can't refresh without rippling. So Mac users who want to take full advantage of their favorite computer's graphic abilities have settled for degraded performance, reinforcing their feelings that the Mac isn't the fastest thing on the block.

Fact: Only nerds love UNIX. Typical Mac users, given the choice between using UNIX and having poison oak on the soles of their feet, have a hard time choosing. Unfortunately, UNIX is still the operating system of choice for many high-end workstations and mainframes. And if the Mac is going to challenge — or even connect to — machines in these markets, it'll have to speak UNIX.

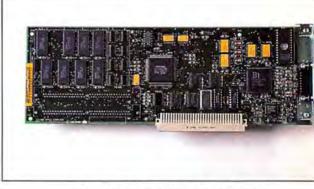
Wicked Fast

The new Mac IIfx is now Apple's top-of-the-line machine, outperforming the IIci by 70 to 100 percent. A Mac II look-alike with six NuBus slots, the IIfx is *the* Macintosh for serious engineering, 3-D graphics, multimedia effects processing, and other CPU-intensive tasks.

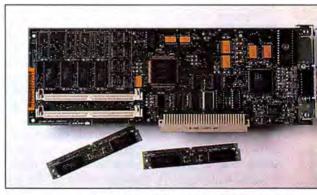
The IIfx owes its speed to several developments.



The Macintosh Display Card 8•24 cc is Apple's RISC-accelerated top-of-the-line card that can be upgraded with unique double-sided SIMMs.



The Macintosh Display Card 8•24 is a 24-bit color card intended to compete with similar units from RasterOps and SuperMac.



The Macintosh Display Card 4•8 is an 8bit color board that can be upgraded to a Macintosh Display Card 8•24 with the addition of 2 megabytes of video RAM.

Macintosh Training That Works

"I have been using FileMaker for about a year now and decided to get the MacAcademy tape to see how the program was presented, the content, and to see if other tapes would be useful. After looking at the tape I promptly ordered three more! Needless to say I was pleased, as the tapes are professionally done and most useful. You and your company do a fine job." Mr. James H. Patterson, M.D.

DAYTONA BEACH, FL- "There's got to be a faster, easier, and less expensive way!" This statement sums up the frustration that Randy Smith felt three years ago as he tried to find training for the Macintosh computer.

That frustration led to the creation of MacAcademy, now the nation's leading Macintosh training program. and the recent introduction of the country's first complete Macintosh Video Training Series. MacAcademy teaches over 18,000 people each year in 65 major metro areas. The program is proud of the fact that both beginning and advanced Macintosh users, from over 12,000 companies large and small, have found MacAcademy's live workshops to be an excellent, low priced training solution.

In order to offer additional training, MacAcademy's next step was to put each of their dynamic training workshops on video. (And to offer an additional dozen training videos for programs not even offered at MacAcademy.)

Now you may choose from over 26 different, 2-hour, VHS MacAcademy Videos for only \$49 each. complete list of programs can be found in the coupon below.

MacAcademy Video Training tapes offer tremendous advantages for today's Macintosh user. When using the videos you actually see the steps take place on a Macintosh screen. A small inset will show you the instructor and the mouse or keyboard. The instructors featured on the videos are MacAcademy's top rated teachers who have trained employees of all but two of the USA's Fortune 500 companies and who have each received a consistent rating of excellent.

Training videos offer the valuable advantage of building a learning and reference library. If you ever want to brush up on a technique, simply go back to the video and review the technique demonstrated. If you hire a new employee, simply have them review the video for the program they'll be using. Videos offer the unique flexibility of teaching both individuals or hundreds of people at one sitting.

In addition to a super \$49 price, the videos also carry a 30-day satisfaction guarantee. If you're not totally satisfied, simply send the tape back for a full refund.

MacAcademy will continue offering the nation's highest rated live training courses in major cities. But in addition, you may also build your Macintosh training library.

Videos may be ordered by phone with credit card information, or by mail with check, credit card, or purchase order. You may also send orders by FAX. Your business is appreciated and your satisfaction is guaranteed.



The MacAcademy Video Library features over 26 Macintosh training tapes. Each two hour VHS video tape captures the unique and effective teaching and learning techniques of MacAcademy's top instructors.

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CITY	STATEZIP
TELEPHONE	
CREDIT CARD NO.	
SIGNATURE	CARD EXP. DATE

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Macintosh Ilfx

Apple surprised everyone (even us) by using a 40-megahertz 68030 CPU, skipping the 33-megahertz variety altogether, and combining it with a 40-megahertz 68882 floating-point processor for numerically intense applications.

You can impress your friends with the megahertz figure, but don't overlook the IIfx's other enhancements. The motherboard contains a 32K cache of superspeedy SRAM (static RAM) that keeps the CPU at top efficiency. (To see what role hardware cache has in performance, see the reviews of Fast Cache IIci and MaraThon Racer in this issue's StartUp section.)

Input and output processing has also been accelerated with three new chips. Two are dedicated to controlling the serial ports, ADB ports, and the FDHD floppy-disk drive, freeing the CPU from performing low-level I/O tasks. This translates into faster serial-port functions, such as Local-Talk and modem communication. Your hard-disk drive and other SCSI devices will run faster with the IIfx. A SCSI/DMA controller chip enhances the SCSI bus by providing devices on the bus with direct access to memory. This frees the CPU for simultaneous, or "latched," reads and writes from the IIfx's newly designed SIMMs.

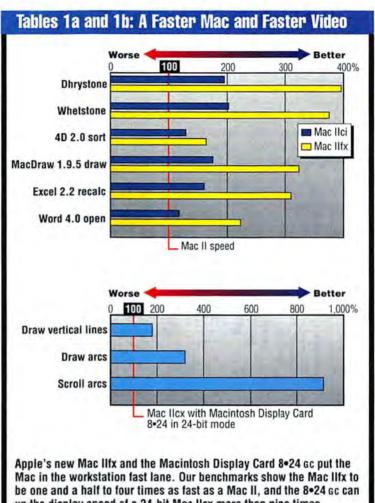
A sound port on the back of the IIfx produces 44.1-kilohertz (CD-audio rate), 8-bit, stereo-sampled digital audio for multimedia buffs. A Processor Direct Slot for third-party boards is built in to the motherboard for future applications, offering faster

CPU access than does a NuBus slot. Unfortunately, it's different from the PDS on the SE, SE/30, and IIci, which are, in turn, different from each other.

For Mac II and IIx users covetous of the IIfx, Apple will have an upgrade program that will let you swap your old motherboard for the new one. Pricing was not available at press time, but knowing Apple's past upgrade policies, it won't be cheap. In addition, you won't be able to use your old SIMMs. The new 80-nanosecond SIMMs have 64 pins instead of the normal SIMMs' 30. Apple says that several third-party manufacturers have committed to manufacturing the new SIMMs, but don't expect the supply to be plentiful - or cheap. Because the Mac IIfx is expected to list in the \$10,000 to \$12,000 range, expensive SIMMs may be the least of your worries.

Video Simplified

Three new display cards represent both an expansion and a contraction of Apple's line. Instead of selling seven cards. Apple has decided to shrink its offerings to just



up the display speed of a 24-bit Mac Ilcx more than nine times.

four: the previously released Monochrome Display Card and the three new boards. All the new Macintosh Display Cards automatically recognize and configure themselves to work with any Apple monitor. They support RS-170 standard timing for output to interlaced-video products such as TVs and VCRs. This makes them easily compatible with composite-video devices (although you'll still need an NTSC convertor). But the big news is that Apple has conquered the palette/performance paradox.

With the Mac IIfx's increased computing speed and 32-bit QuickDraw's 16.7 million colors, Apple had to boost the video-display speed, and doing that meant taking a RISC. The Macintosh Display Card 8-24 gc is a combination display card/graphics coprocessor that incorporates an Am29000 RISC chip on-board. The 29000 runs at 30 megahertz and speeds up performance to between 5 and 30 times that of conventional systems, so you can see complex graphics nearly as quickly as the IIfx can generate them. Unlike other RISC coprocessors that require customized applications, the 8.24 gc will work

The less time you spend creating effects like these, the better.

Now you can add new zip to any document—or try out special effects in a flash—with Smart Art™ software. Each volume in the Smart Art library contains fifteen effects, so your text can cast a long shadow or wrap around a circle in seconds. Smart Art effects save a lot of time because they're ready to use in vir-

tually any application. Yet it's easy to customize these pre-built libraries of graphic and type effects by changing the font, size, shading and much more.

How does it work? Smart Art is a desk accessory that cleverly uses the PostScript* language in your laser printer to create special text, 2D

and 3D effects on your Macintosh* screen. Once you're satisfied with the effect you've made, paste it into your drawing, word processing or desktop publishing program and output it with any Adobe* PostScript printer or other device. Of course, Smart Art works with any PostScript language font, too.

The less money you spend creating effects like these, the better, too. That's why Smart Art's suggested retail price is only \$149.95 a volume. New volumes are also available, so if you don't see the effect you need, just call 1-800-344-8335. Outside the U.S.A. and Canada, call your local distributor.



Slanted

Circle Sexting

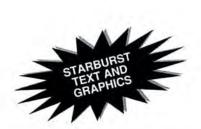
A n g l e d

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Neon



Split Reverse

VDD3E



Macintosh Ilfx

with any applications — without software modifications — and "32 bit clean" programs will perform even better.

form even better.
On bootup, a special file downloads a RISC-optimized version of

With the Macintosh Ilfx's increased speed and 32-bit QuickDraw's 16,7 million colors, Apple had to take a RISC.

QuickDraw directly to the board's 2 megabytes of VRAM (video random-access memory). From that point, the 29000 takes over and pages information in 64K blocks into the 64K SRAM cache on-board. Apple estimates

Chips of the '90s

The combination of integrated hardware, operating system, and application software is a great part of the Mac's superior windowing speed, but Apple also has Motorola to thank. The 68000 series of CPU chips has improved a great deal since the original 128K Mac, and although Intel's 80x86 line (the heart of all PC-compatible machines) has also improved, it wasn't designed with graphics in mind. In fact, because of its graphics superiority over the Intel 80486, the 68040 will put the Mac further ahead of the PC in graphics speed.

Just compare the newest generation of CPUs for the desktop market, Motorola's 68040 and Intel's 80486. Both use very, very large-scale integration to pack more than a million transistors into a few square inches. Both chips run at dozens of megahertz of clock cycles (a quotable but meaningless statistic), but according to Motorola, the 68040 will be a screamer for 3-D graphics and CAD, about 350 percent faster than the 80486 in floating-point operations, which is the name of the game in graphics. For other functions, the 68040 can deliver 21 MIPS (million instructions per second), compared with 15 MIPS for the Intel 80486. The reasons behind this stunning performance include a built-in floating-point coprocessor (the 68882 chip is no longer required), large (4K) on-chip caches, and the highly parallel nature of the chip design.

The 68040 even boasts performance on the level of Motorola's 88000 RISC-based chip set. Apple has been studying the 88000 RISC set for more than a year but is most likely not considering it for a Mac CPU, because Mac software would have to be rewritten to run on the 88000. Not so with the 68040. Applications — and, more importantly, the Mac operating system — should operate normally without modification.

Apple says a 68040 Mac will be available as soon as it can get large volumes of the chips. Motorola says quantity parts should be available by this summer. Therefore, we should see a 68040 Mac by early 1991, unless Apple puts it on the back burner in reaction to John Sculley's call to "turn up the fire" on the low-end-Mac effort. As for the 80486, it got off to a shaky head start when Intel had to replace bug-ridden chips already installed in PCs.

What's next? Motorola and Intel are already preparing the 68050 and 80586 generation for 1991 – 92 and are considering possible 68060 and 80686 chips a few years beyond that. Motorola says it will replace the silicon in some versions with much faster gallium arsenide (but if you have to ask, you can't afford one).

- John Rizzo





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Macintosh Ilfx

that swapping will occur only about 3 percent of the time, so performance shouldn't be noticeably affected. And for even better performance, the card has two SIMM sockets for adding 2 megabytes of DRAM (dynamic RAM) now and, eventually, up to 8 megabytes with third-party 4-megabyte SIMMs. These are special double-sided SIMMs. Although Apple will release the specs to third-party manufacturers, it will

probably be the only source for some time. Although exact pricing wasn't set at press time, the card is expected to list for around \$2,100 when it's available this summer.

And for users who need color but don't have a crying need for the 8•24 gc's speed, the Macintosh Display Card 4•8 and 8•24 provide an upgradable 8- to 24-bit-color answer but without the RISC coprocessor or the high degree of expandability. The 8-bit 4•8 card displays up to 256 colors on an Apple color monitor and up to 16 grays on Apple's monochrome models. The 8•24 is a 24-bit card that displays up to 16.7 million colors on Apple's color monitor and 256 grays on Apple's monochrome monitors. With the addition of 2 megabytes of VRAM SIMMs, a basic 4•8 model (expected to cost about \$700)

A/UX 2.0 opens the Mac up to UNIX without alienating Mac users who can still see and use their familiar desktop and applications.

can grow to a full 24-bit unit (expected to list for about \$1,000).

UNIX with a Human Face

Although what Apple has achieved with A/UX 2.0 may not be as earth-shaking as recent events in Eastern Europe, the sight of a normal Macintosh window running a UNIX application under MultiFinder is nearly as startling. A/UX 2.0 fulfills the

promise of opening the Macintosh up to UNIX without alienating Mac users who can still see and use their familiar desktop and applications with virtually no performance degradation (Apple estimates the gap at around 2 percent).

With the Mac IIfx and the 8•24 GC display card, Mac users need no longer suffer from performance anxiety. And with A/UX 2.0, UNIX need no longer be a hostile territory. So if you hear any rumbles of discontent, they might be coming from disgruntled DOS users.

Russell Ito is currently searching for a mortgage on a Mac lifx, John Rizzo torture-tests new Macintoshes (among other things) as *MacUser's* technical editor.



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Internal drive kits for SE, SE/30, II, and IIx 20MB Internal HD. 24180 - \$325 40MB Internal HD. 24181 - \$425 80MB Internal HD. 24182 - \$600 100MB Internal HD. 24183 - \$700

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Drive	20	40	80	100
Formatted Capacity	21.4MB	42.65MB	84.3MB	104.9MB
Access Time (ms) Average	27	25	25	25
MTBF (power on hours)	70,000	70,000	70,000	70,000
Transfer Rate MB/sec	1.25	1.5	1.25	1.25
Shock Rating Transit	50G	50G	50G	50G
Weight	<1.1 lbs.	<1.1 lbs.	<2.0 lbs.	<2.0 lbs.



External Hard Drives

Drive	20	45+	80+	100+
Formatted Capacity	20.6MB	46.7MB	81.5MB	105MB
Access Time (ms) Average	65	28	28	19
MTBF (power on hours)	100,000	70,000	70,000	50,000
Transfer Rate MB/sec	1.5	1.5	1.5	2.0
Shock Rating Transit	60G	60G	60G	60G
Dimensions		2.25"ht x 9	.5"d x 9.5"w	
Weight, less than	<10 lbs.	<10 lbs.	<10 lbs.	<10 lbs.

Drive, Drive, Drive

A dependable, preformatted Cutting Edge disk drive fits so neatly under your Macintosh, it'll be hard to remember that you bought it separately. The Cutting Edge housing — as sleek as it is rugged and compact — features the same convection cooling as your Mac does, so the drive runs quietly, too. Easy to install. Complete with SCSI cable (with lifetime guarantee), Apple System, HD Backup utility, anti-viral software, and integrated SCSI controller. Also includes a personalized copy of TCE Manager formatting and diagnostic software and, of course, a one-year manufacturer's warranty. Cutting Edge hard drives give new meaning to the word "productivity."

20MB Hard Drive. 24386 - \$359 45+MB Hard Drive. 24387 - \$499 80+MB Hard Drive. 24388 - \$649 100+MB Hard Drive. 24389 - \$899

Printers

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The TI microLaser™ PS is a truly remarkable Macintoshcompatible PostScript printer. Compact, user-friendly, upgradeable and affordable, its standard features can be enhanced to print your applications with style - your style.

Featuring a complete package of Adobe PostScript and HP LaserJet Series II emulations, the microLaser PS prints at 300x300dpi and sports 11 PostScript font families with a total of 35 different fonts - all in an infinite array of point sizes. The microLaser fits neatly on your desk because there are no paper tray wings. Its 250-sheet paper drawer conveniently slides into the machine and accepts paper weights from 16 to 34 lbs. For further options, you can easily add a second paper drawer (250-sheet capacity), which fits underneath the printer, or the optional envelope feeder which hooks onto the manual paper slot and automatically feeds up to 40 envelopes. And upgrading the standard 1.5MB RAM is as easy and economical as adding memory boards - up to 4.5MB RAM total. The microLaser is LocalTalk-ready and compatible with the Centronics* parallel interface. microLaser PS. 22851 - \$2425

A Family Of Printers

Envelope Feeder. 38712 - \$299 Second Paper Drawer. 38713-\$325

When it comes to impact printers, the Epson name is synonymous with quality.

The Epson LX-810 is a hard-working 9-pin, 80column, dotmatrix printer that works as well for the business user as it does for the student. With an 11-inch

carriage, it prints in draft mode at 180cps and in near letter quality at 30cps. Delivers 240x216 bit-mapped graphics and features three resident fonts.

Epson LX-810. 56303 - \$199

For higher quality dot-matrix output, the 24-pin Epson LQ-510 adds letter quality print, user-defined characters and more font choices and typestyles. 11-inch carriage. Automatic cut sheet feeder. Prints 180cps in draft mode and 60cps in letter quality mode. Produces 360x360 bit-mapped graphics. Epson LQ-510. 56340 - \$349

For speed, economy and impact you can't beat the the Epson LQ-2550, Epson's topof-the-line dot-matrix printer. With a 15-inch carriage, the LQ-2550 provides letter quality documents at an amazing 133cps. 400cps in draft mode. 360x360 bit-mapped graphics. Eight resident fonts and hundreds of typestyles. Seven-color capability with multi-colored ribbon. Epson LQ-2550. 56339 - \$999





Grappling With Printer Reality If the question is, "How does my third-party printer connect to my Mac?", the answer is an Orange Micro Grappler. The Grappler connects to Epson, Hewlett-Packard, Toshiba and other 9-pin and 24-pin dot-matrix printers, including the Epson printers listed on this page. Orange Micro Grappler. 22853 - \$136





Defies Any Label

Remember the awful '80s when printing labels from your Mac was about the LEAST fun you ever had? Now the new Seiko Label Printer promises us all a brighter future in the '90s. Prints letterquality labels, bar codes, and large type without ever interrupting your other computer work. Takes only a small space, operates quietly and independently of other printers.

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PhoneNET Star Connector. 22512 - \$18 PhoneNET Star Connector 10 pack. 22515 - \$138

Bridging The Gap

If your network has exceeded the 32-node limit (or slowed to a crawl before it even reached the limit), it's time for a Hayes InterBridge. InterBridge lets you connect local LocalTalk networks or bridge the gap between remote networks equipped with modems. The InterBridge actually enhances overall network performance while it ties networks together. Lets more people communicate and share printers or other devices on connected networks, too. InterBridge Manager software included enables network managers to customize network connection for particular needs. Hayes InterBridge. 22509 - \$645



Gaining Speed

If your company is expanding by leaps and bounds, the last thing you need is lackluster network performance. Give your growing LocalTalk network a speed boost with Shiva's NetBridge. Plug in two LocalTalk networks and the Shiva NetBridge will make network deterioration a thing of the past. NetBridge is a natural network builder; it doubles your network capacity when you plug it in. Software provided ensures network security and hassle-free network management. Shiva NetBridge. 22505 - \$339

Share And Share Alike

Get the most use from your serial peripheral devices by sharing them on the network. Printers, scanners, high-speed modems, or plotters — the Shiva NetSerial connects most serial peripherals to your LocalTalk network. Offers

transfer rates up to 57,600 bit/sec with simple 8-pin, mini-DIN connections from LocalTalk to several brands of minicomputers.

Shiva NetSerial X232. 22504 - \$275

Crossing Network Borders

You no longer need one box to serve as a gateway, another to share serial devices and a third to connect to remote networks. Now you can connect an EtherTalk LAN and two LocalTalk LANs to create a fully-functional internet. Link the internet to a serial port so all workstations can access peripherals on the other side. Or use the serial port and a modem to connect remote internets. You can even dial in to your internet through EtherGate from a remote Mac or PC with a modem.

Shiva EtherGate. 22508 - \$1825

Get All Kinds Of Access

If your workgroup shares peripherals via LocalTalk, now you can share a 2400 or 9600 baud modem as well. Shiva's NetModem enables everyone on the network to transmit data over phone lines. The network user simply selects the NetModem in the Chooser, starts the communications software — and the transmission begins. Flashing messages in the Mac menu bar enable senders to monitor transmissions without leaving the office. And, if you're on the road, you can call the NetModem to send messages by electronic mail.

Shiva NetModem V2400. 22507 - \$435 Shiva NetModem V32. 22528 - Call



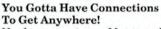
· Full one-year limited warranties on all products!



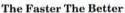


How can something as simple as a good LocalTalk cable connector be so hard to find? MacAvenue has the answer with its guaranteed LocalTalk connectors. Fits right in to any LocalTalk set-up. Just make the connection and you're in business.

MacAvenue LocalTalk Connectors DB-9 LocalTalk. 22520 - \$32 DB-9 PhoneNet. 22522 - \$23 DIN-8 LocalTalk. 22521 - \$32 DIN-8 PhoneNet. 22523 - \$23



Need to connect your Mac to an Ethernet network without losing your internal slot? The Adaptec Nodem lets you do so without compromising network connectivity. The Nodem can also be used as a temporary network "dock" for portable computers. Available for your THICK or THIN (Cheapernet) networking requirements. Compatible with all Macintosh models except 128K/512K. Adaptec Nodem THICK. 22500 - \$395 Adaptec Nodem THIN. 22527 - \$395.



22524

Make the most of your network investment with the Asanté MacCon Ethernet interface boards. Full compatibility with AppleShare, Novell's Netware and TOPS. Among the fastest Ethernet boards on the market, the Asanté MacCon II/E supports full 32-bit data transfer at speeds up to 10MB/sec over distances up to a thousand feet.

V	Mac II	SE	SE/30
Thick	22524	22525	22526
Thin	22524	22533	22530
Twisted Pair	22529	22532	22531
MacCon	\$395	\$295	\$395

Dove Fastnet SE Ethernet card. 22501 - \$353 Dove Fastnet III Ethernet card. 22502 - \$373

Dove FastPath 4 Gateway. 22510 - \$1935 Farallon Portable Pack. 22519 - \$373 PhoneNET DB-9 Connector. 22511 - \$28 PhoneNET Din-8 Connector. 22513 - \$31 PhoneNET to LocalTalk Adaptor. 22514 - \$31

PhoneNET Repeater. 22517 - \$313 Star Wiring Kit Harmonic. 22518 - \$64 Shiva Telebridge. (See page 14 for description.) 22506 - \$339 Tops Flashbox. 22503 - \$108

22533



Smarter Communications

Enjoy fast and simple connections to remote computer systems with the help of Hayes SmartCom II communications software. Uses the Mac graphical interface to let you simultaneously print, store and view incoming data.

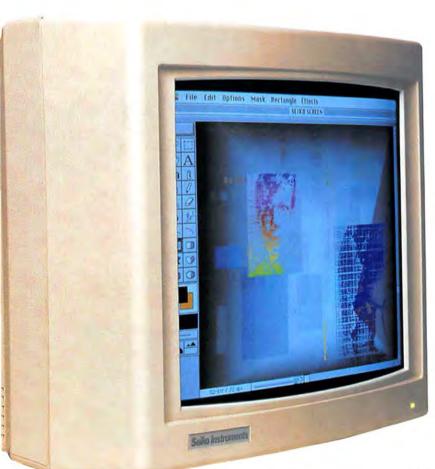
Hayes SmartCom II. 27662 - \$84

Call 800-477-6221 ·





Video



Color To The Max

The Sigma ColorMAX monitor brings presentation graphics, illustrations, and design applications to a new level of color display quality on the Mac II. A 19-inch Sony Trinitron screen is the heart of this high-resolution, 256-color monitor. Refreshes 8-bit color at 70 plus Hz. Sigma ColorMAX 19-inch Color Monitor. 22000 - \$4999

One Page At A Time

Get a new view of the world with the PageView full-page display system for the Mac SE. Control Panel enables you to select display modes, system font sizes, screen save, dual or single screen operation mode, and cursor size.

Sigma PageView 15" SE. 22101 - \$999
Sigma PageView 15" SE 30.
22106 - \$1050
Sigma PageView 15" Mac II.
22100 - \$1050

Color You'll Remember

E-Machines' high-resolution, 256-color monitors provide stunning color display for the Mac II utilizing a specially adapted Sony Trinitron picture tube. The 16-inch monitor refreshes at 67 Hz while the 19-inch monitor refreshes at 71 Hz. Once you've seen THIS kind of color, you'll never be able to settle for less! E-Machines T-16 Color Monitor. 22003 - \$3199

E-Machines T-19 Color Monitor. 22004 - \$4665

You Gotta Wear Shades

The Seiko 14-inch color monitor and RasterOps Color Board 264 create BRIGHT colors. 43% brighter than the Apple solution. And the picture is sharp all the way to edge of the screen. By combining Sony Trinitron technology and RasterOps 24-bit color technology, the Seiko monitor gives you the best color for the best price! Seiko 14-inch Color Monitor. 22002 - \$595 RasterOps Color Board 264. 23531 - \$699

22002



More View For The Mac

Exploit the full power of the Mac II with the Sigma SilverView 21-inch monitor. The 72dpi display area gives you both single-page and two-page spread displays. A fast-moving 73 Hz refresh rate means you'll never be bothered by a flickering screen. You'll get more precise graphics and better layouts because you can view full pages and spreads. Customize the monitor to fit your style with the tilt/swivel stand and full contrast/brightness controls. SilverView Mac II Monitor. 22104 - \$1599 SilverView SE 30 Monitor. 22103 - \$1599 SilverView SE Monitor. 22107 - \$1599

See Me. Feel Me. Touch Me.

Install the Microtouch Mac 'N Touch touch screen over your Mac SE, Apple-Color, or other monitor, connect it to the Apple Desktop Bus and — wow! — your monitor turns into the gateway to your software. No more imposing than an antiglare filter, the Mac 'N Touch is the ultimate intuitive interface. Touch any icon on the screen and drag it where you need it with your finger. With a resolution of 1000x1000 touch points, the Mac 'N Touch averages the points you tap or touch to one precise pixel position. Ideal for self-running demos. Works with most software without modification. Mac 'N Touch. 22202 - \$445







Super Human Graphics

Silicon Beach's SuperPaint helps you create graphics for highresolution output with a sophisticated AutoTrace tool that automatically converts paint graphics into draw objects. Then, with its SuperBits feature, SuperPaint sets you up to edit the bitmaps. Pair these powerful features with text manipulation, calligraphy, brushes and a freehand tool for Bezier curves, and you have a world class graphics package.

SuperPaint. 29222 - \$124

Set Your Imagination Free

Retouch photographs, recombine elements from several images, and rediscover your creativity with Digital Darkroom. Special effects include solarization and blurring as well as stretching and other perspective changes. Digital Darkroom's tools allow you unlimited gray-scale image manipulation. And, when you've captured the masterpiece, Digital Darkroom produces high quality halftone output.

Digital Darkroom. 29224 - \$248

The Big Screen Experience

When you're ready for a larger monitor, the first step is a Mobius MultiScreen SE Video Card. Links the Mac SE to most monochrome monitors including the Apple Portrait Display. Supports dual-screen display, meets stringent standards for portrait display, and redraws the screen 30% faster than your original SE monitor. Mobius Multiscreen Card. 23530 - \$295

MacUser May 1990

Input Devices

Mice

A. Turbo Charged!

Trackball users have different reasons for leaving their mouse behind, but the Kensington Turbo Mouse is one of the most popular. Sensing your movements, it adjusts cursor speed accordingly. Move slowly for pinpoint precision. Speed up and the cursor accelerates with you. Turbo Mouse ADB. 25281 - \$107 Turbo Mouse Plus. 25280 - \$107

B. Mousing Around

Find yourself too often in a mess with your mouse cord? The Mobius Cordless Mouse uses infrared technology to control the cursor up to 20 feet away. Fine-tune mode for smooth, precise cursor control. A separate button controls extra fine and accelerated movement. Mobius Cordless Mouse. 25282 - \$97

Keyboards

C. A Key Part Of Your System

An extended keyboard that works with ANY Macintosh, the DataDesk MAC 101 adds all the F-Keys and other key commands — even to an older Macintosh. Costs less than the Apple model, too! And, if you have a Plus or earlier Mac, you have real cause to celebrate. MAC-101 Keyboard, ADB. 25180 - \$134 MAC-101 Keyboard, Beige. 25181 - \$134

Scanners

D. Handmade

If you need to scan images into your Macintosh documents but can't set up an elaborate scanning station, try the handheld ScanMan from Logitech. You'll get 32 shades of gray in photographs, drawings, logos, and illustrations up to four inches wide. Connects directly to the Mac SCSI for easy installation. Resolution from 72dpi to 400dpi delivers a quality image both on screen and on paper.

ScanMan 32. 22751 - \$320

E. The Future Is In Color

The MicroTek 300Z Color Scanner is a full-featured color scanner at a gray-scale price. Get 16.8 million colors with 256 shades of gray and 24-bit color at 300 dpi. Includes SuperPaint and Digital Darkroom.

MicroTek 300Z Color Scanner. 22755 - \$2150

MicroTek MS-II B&W Scanner. 22756 - \$1080 Complete Page Scanner. 22753 - \$758 Complete Halfpage Scanner. 22752 - \$313 ThunderScan 5.0. 22754 - \$176



Digitizers

F. Super Big Chief Tablet

Brings a tear to the Big Chief's eye. This SummaGraphics Bit Pad Plus digitizes information as you "draw" on the tablet. Trace drawings or sketch freehand. Then, in a wink, view the image. Also performs all mouse functions — guides the cursor, selects icons, and opens files. Beats the heck out of those Magic Slates we had as kids!

SummaGraphics BitPad Plus. 26885 - \$318

Sound

G. Music Master

The PassPort MIDI Interface opens up the world of music on your Mac. Installation is simple — Passport MIDI draws its power from the Mac so it requires no additional adaptor. Actually allows you to connect several instruments in a daisy-chain. PassPort MIDI Interface. 23732 - \$76

Put That On The Record

Add sounds to the sights in your presentations. MacRecorder digitizes sound from any source — the audio digitizer has a built-in mike — and gives you the tools to edit the recording. Special effects included. MacRecorder. 23730 - \$162

Electronics

Power Supplies

H. Don't Stop The Power

When a surge suppressor just doesn't offer enough protection, plug your Mac into an Uninterruptable Power Supply from American Power Conversions. This UPS draws on its battery to keep your system running after a power failure until you can back up and exit properly. The UPS can even initiate an unattended network shutdown when you install it on a network server. Uninterruptable Power Supply. 26292 - \$425

Accessories

I. Heat Up, Cool Down

When things heat up, you can keep your Mac cool with the Fanny Mac, a combination cooling fan and surge suppressor. Pulls cool air through to keep memory and/or internal drives from overheating.

Fanny Mac. 26880 - \$58

Dial "A" For Automatic

Install HyperDialer, open your HyperCard rolodex, and you're ready to dial any number at the click of your mouse. Also dials phone numbers from QuickDex, Focal Point, Sidekick, and SuperCard address books. No modem required.

HyperDialer. 26886 - \$23

Kensington System Saver, Beige. 26888 - \$62 Kensington System Saver, Platinum. 26889 - \$62 Power Strip Surge Suppressor. 40508 - \$68.95

Connectors

J. We Have The Best Connections When you're building a Mac system, use

quality MacAvenue cables.

MacPlus, SE, Mac II to Hayes-compatible modem. $6\,\mathrm{ft.}\ 26285$ - \$25

MacPlus, SE, Mac II to Imagewriter II. 6 ft. 26287 - \$25

MacPlus, SE, or Mac II to Imagewriter. 6 ft. 26286 - \$25

Mac to SCSI System cable. 2 ft. 26280 - \$39

Mac 128/512 Hayes-compatible modem cable. 6 ft. 26281 - \$25

Mac 128/512 to Imagewriter. 6 ft. 26282 - \$25

MacPlus, SE II to Apple modem. 6 ft. 26284 - \$25

K. SCSI Extension Cable

SCSI Extension cable. 6ft. 26288 - \$25 SCSI System cable. 6ft. 26290 - \$35 SCSI Peripheral cable. 2ft. 26289 - \$25 SCSI Peripheral cable. 6ft. 26291 - \$35

MacPlus peripheral adaptor cable. 6 ft. 26283 - \$25

Extra long ADB cable. 26900 - \$24

L. Another Kind Of Connection

Connect two peripheral devices to one serial port, or connect two computers to one peripheral with the Kensington A-B Box. Compatible with all Macintosh models and with the Apple IIGS. Kensington A-B Box. 26890 - \$65.



· 90-day no-cost product replacement.



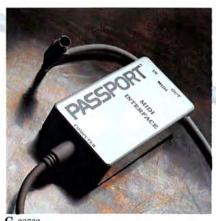
















LACCIONES WWW.COLUMNS OCAMBON COL

H 26292

L 26890

MacUser May 1990



Memory

Build Your Memory

Face facts. Newer and more powerful software programs are memory hogs. You always need more RAM. With 2MB to 4MB you can run at least a couple of applications with MultiFinder. If you really want to get serious, four of the new 4MB SIMMs means you'll have 16MB of RAM power, and that means the sky's the limit. MacAvenue offers only the best surface-mounted products. And you'll get a step-by-step installation guide and a tool to "crack" the Mac Plus or SE. 1MB SIMM. 25480 - \$Call 4MB SIMM. 25481 - \$Call

Boards

Full Speed Ahead

DayStar Accelerator Cards can double or even triple the performance of your Mac II, IIx, IIcx or IIei by giving you up to 12 MIPS of unbelievably fast processing power. DayStar cards have a long-standing record of reliability and high quality. All cards come ready to use. Simply plug into the NUBUS slot. DayStar 030 - 25MHz II/IIx. 23632 - \$1795
DayStar 030 - 33MHz II/IIx. 23633 - \$3095
DayStar IIci Cache Card. 23634 - \$754

Television In The
Computer Age
MicroTV lets you watch television, the VCR, or
any other video source through a window on your Mac
screen. MicroTV actually lets you operate most programs while
video runs in a separate window. Capture any MicroTV image with a

video runs in a separate window. Capture any MicroTV image with a keystroke and save the image in PICT II format on the Clipboard. Use the captured image in a newsletter, report, or any other document. Includes 32-bit QuickDraw, channel control, and onboard tuner. Aapps MicroTV. 23731 - \$275



Dove's MaraThon 68030 accelerator card doubles the speed of your SE 30, while the 16MHz 020 accelerator makes an SE run faster than a Mac II. Edit detailed graphics and calculate columns in complex spreadsheets or jump from one application to another without waiting for your Mac to catch up. Once you've seen your Mac go this fast, you'll never want to go slow again!

Dove 33MHz SE 30 Board.

23636 - \$965

Dove SE 020 with 881 and 1MB. 23637 - \$875

Win The Marathon

from one waiting you've 'ill 23637

Great Price. Great Service. We're Here To Play.



At MacAvenue we're reaching into the future. Keep an eye out for smart, new MacAvenue hardware products, developed by our engineering design group. We'll deliver them to you, manufacturer direct, at terrific savings. Order by phone, fax or mail.

Love us or your money back. \$2 overnight delivery! Toll-free expert product support. 30-day money-back guarantee on anything and everything you purchase. Full one-year limited warranties on all products. Quantity discounts. And, if you don't find what you want here, call us. We'll get it for you. Call toll-free TODAY!

MacAvenue's Stress-Free Guarantee

1.30-Day Money-Back Guarantee

No questions asked. Every product MacAvenue sells will give complete satisfaction. If not, return it in the original packaging within 30 days of purchase. We'll refund your money or we'll pay the return freight, replace the product with new merchandise, and pay the freight back to you.

2. Toll-Free Technical Support • 90-Day Product Replacement

Should you experience a problem with anything you purchase from MacAvenue, call our product support staff at 800-766-6221 weekdays from 8:00am to 7:00pm, CST. We will be happy to assist you with any hardware or software difficulty. If we cannot resolve the problem over the phone, we will assign you a return material authorization (RMA) number and a Federal Express number. We will replace the product with equivalent merchandise and pay the shipping both ways.

3. One-Year Limited Warranty • We Pay Return Freight

For up to one full year after your purchase, MacAvenue will replace or repair (at our option and without cost to you) any product you are not completely satisfied with, and we will pay for return freight to you.

\$2 Overnight Delivery

800-477-6221

Order Toll-Free Today!

Everything we do at MacAvenue is designed to make it easy for you to get the affordable, reliable Macintosh products you want when you want them.

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- Purchase orders accepted on a net terms basis with approved credit (minimum \$500 initial purchase, thereafter \$50).

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Communications

Fax

Just The Fax, Ma'am

This indispensable communications unit combines fax transmission, a graphic image scanner, and smooth user interface to your Mac. Sends and receives text and graphics by downloading files from Mac or standard paper input. Quite portable and easy to install. Can also be used as a desktop copier. Relisys Telefax RA2110. 56072 - \$1295

Modems

Link Your Mac To The World

The DataLink Mac is an internal 2400 baud modem for your Mac II which includes its own serial port, allowing you to add extra serial devices. The DataLink Mac can also be upgraded to send fax messages, when you're ready. DataLink Mac. 22307 - \$325

Expressly For The Mac

Hayes-compatible at 300 to 2400 baud, Applied Engineering's DataLink Express is the external modem made expressly for the Mac. Status light array enables easy monitoring of all transmissions. Package includes comprehensive communications software. Optional Send-Fax capability. DataLink Express. 22306 - \$215

A Port-A-Modem Deluxe

Designed specifically for the Macintosh Portable, the DataLink/Mac Portable is a state-of-the-art 2400 baud internal modem featuring error correction, a Send-Fax support option and low power operation which can extend the life of the Portable's battery. The modem also supports "Sleep mode," automatically cutting off power to most of the board when the modem is not in use. Software included.

DataLink/Mac Portable. 22308 - \$299



Send It Fast!

Whether you're transmitting vital program code or valuable text documents, using the V-series Hayes Smartmodem 9600 assures maximum reliability for your data. Selects speed automatically on the initial handshake and transmits from 9600 down to 300 baud. On-line compression enhances data throughput, cutting data transmission time in half. Saves operator time by analyzing connection possibilities and choosing the most efficient option. (That means you pay less for transmission time!)

Hayes Smartmodem 9600. 49578 - \$895

Connect a Hayes Smartmodem 1200 or 2400 to your
Mac, plug it into a phone jack, and you're
ready to transmit and receive data. The
Smartmodem 1200 adjusts speeds automatically from 1200 to 300 baud,
monitors the connection, redials the last
number called until it makes a connection, and can receive calls unattended.
The Smartmodem 2400 automatically
sets transmission rates from 2400 to 300
baud and features digital signal processing, full international compatibility, call
progress monitoring, and self-diagnostic

tests. Hayes Smartmodem 1200. 49501 - \$299 Hayes Smartmodem 2400. 49576 - \$385

From One State To Another

If you're a long way from the office but want to keep in touch, the Shiva TeleBridge will make you feel like you're right next door. With a Shiva TeleBridge and a high-speed modem at each location, you can print documents and send electronic mail to the New York office from the beach in Malibu. Now that's communicating! The only bridge that supports transfer rates up to 57,600 bit/sec, the TeleBridge can move vast amounts of data from coast to coast in minutes. With this equipment, who needs overnight mail service?

Shiva TeleBridge. 22506 - \$339

CompuAdd Modems

CompuAdd Modem 1200 baud. 22304 - \$99 CompuAdd Modem 2400 baud. 22305 - \$159



· Full one-year limited warranties on all products!

Storage

You Can Take It With You

Loss, theft, and hardware failures are the enemies of data security. But with this 44MB Bernoulli hard drive you can give your data both security and portability. Use it with the new Macintosh portable or on your desktop. A portable drive makes a wonderful solution to the problems of backup and storage, too. Operates for two hours between battery charges. Offers nine utilities to manage and safeguard data. And, PageMaker fans, this storage device is endorsed by Aldus.

IOmega Portable 44MB Hard Drive. 24385 - \$1850

IOmega Bernoulli Cartridge 3 Pack. 57805 - \$199

Laser Power

An 800KB drive is a convenient and useful peripheral for your Macintosh. The Laser 800KB Floppy Drive gives you fast 12ms seek time along with quiet, reliable operation.

Laser 800KB Floppy Drive. 24734 - \$175

Translation, Please

Sooner or later, even dedicated Macintosh converts will have to read something from a DOS floppy again. With DaynaFile, you'll never have to worry again about remembering any complicated command-driven process to read from an IBM-compatible. You manage a DaynaFile just like a conventional Mac drive dragging, selecting and opening files. It operates transparently through your Macintosh applications, connecting to your Mac through the SCSI port. A DaynaFile can be daisy-chained to as many as six devices, and its icon appears on your desktop. DaynaFile 5.25" 1.2MB. 24732 - \$550 DaynaFile 5.25" 360KB/1.2MB.

Quick, Get It On Tape!

24733 - \$725

Maximum data security is yours with a Tecmar tape backup. Units include iconinterfaced software and are compatible with all Mac hard drives. Tecmar QTs operate in the background under Multifinder, so you can still use your Mac MacUser May 1990

while you're backing up or restoring. Optional SCSI T-cable makes QT Mac units portable so you can use them with more than one Mac.
Tecmar QT Mac 40MB Tape Backup.
23830 - \$950
Tecmar QT Mac 80MB Tape Backup.

23831 - \$1225 Tecmar QT-40 Cable Kit.

24931 - \$106 Tecmar QT Mac Data Cartridge 3 Pack. 26080 - \$85.00

We Have A Special Rapport

Demand more from your floppy diskettes with the help of the Kennect 2.4 Drive. Stores 2.4MB on a 1.2MB floppy and 1.2MB on an 800KB disk. Reads, writes, and formats to all 3.5-inch disk standards — Apple and DOS. For Mac SE 30, IIx, IIcx or IIci.
Kennect 2.4 800KB Drive. 24730 - \$325

For your Mac 512KE, Plus, SE or II, use the Kennect Rapport Adapter with your 800KB drive to accomplish what the Kennect 2.4 drive does for other models. Kennect Rapport Adapter. 24930 - \$195

> Sony 3.5" 800KB Diskettes 10 Pack. 57401 - \$14.00 Sony 3.5" 1.2MB Diskettes

10 Pack. 57440 - \$25.00

24734





Seek And Ye Shall Find

Use OnLocation to find lost files in seconds. This speedy little utility stores a compact index of your hard disk and scans this index when you type in even one word from a file. OnLocation scans the text of a file, so even if you completely forget a file name, your data isn't lost for good. OnLocation can find text in word processing files and in PageMaker, Excel, or HyperCard files, too.
OnLocation. 30434 - \$78



Accessories

Carrying Case

A. Hit The Road

Move your Mac in safe style with this padded, water-repellent nylon case. Features locking accessory pocket for disks and fully padded compartments for keyboard and mouse. There's even room for an extra diskette drive. MacAvenue Carrying Case. 26898 - \$65 MacAvenue Ext. Keyboard Carrying Case. 26901 - \$76

Covers

MacPlus/SE System Saver Cover. 26894 - \$8 Imagewriter II Dust Cover. 26895 - \$8 LaserWriter II Dust Cover. 26897 - \$12

Stands

B. Space: The Last Frontier

Free up space on your desktop - stand your Mac II CPU securely on its side beneath your desk so just your monitor and keyboard are left in front of you. Kensington kit includes a stand to support the Mac II and extra-long cables for your monitor and keyboard. Kensington Mac II Stand and Cable Kit. 26892 - \$63

Get A Better Look

Stop craning your neck and slumping over in your chair to see your Mac screen! Use a Kensington Tilt/Swivel stand to get a better angle on the computer screen. Tilts to a twenty-degree angle (your neck isn't THAT long) and swivels all the way around (that's a three-sixty).

Kensington Tilt/Swivel Stand. 25582 - \$21

C. Standing Tall

This printer stand supports most dotmatrix printers, including the Imagewriter. Raises the front 2.5 inches and the back 4 inches to allow you to monitor the printing. Offers paper storage under the printer and paper catcher to keep copy neat. Kensington Universal Printer Stand. 26896 - \$15

Mac II Monitor Stand. 25580 - \$62 Mac II System Stand. 26887 - \$20

· Same day shipment.

Monitor Accessories

D. Stop Glaring At Me!

Getting a glare off your computer screen can be annoying, cause red eyes and give you a headache. A Kensington Anti-Glare Filter reduces screen glare by 91% and improves screen clarity more than 15 times. Attaches to any Macintosh nine-inch monitor with adhesive fasteners no tools required. Save your sunglasses for the times when you just want to look cool.

Anti-Glare Screen, Beige. 26882 - \$32 Anti-Glare Screen, Platinum. 26883 - \$32 Apple Color Monitor Polarizing Filter. 26891 - \$62 Mac II Monitor Extension Kit. 26899 - \$32

Data Storage

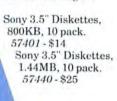
E. Wood That It Were

If you enjoy the natural look and feel of wood in your office space, stash your disks in one of MacAvenue's teak boxes. Two sizes.

MacAvenue Teak 3.5-inch single row. 41600 - \$20 MacAvenue Teak 3.5-inch double row. 41601 - \$29

F. The Medium Is The Message

Trust your data to the best name in the business - SONY. High-quality diskettes mean that you'll have safer storage and transportation of your valuable information. Check MacAvenue's everyday low prices on diskettes and cartridges.



QT-Mac Data Cartridge 3 pack. 26080 - \$85 44MB Bernoulli Cartridge 3 pack. 57805 - \$199 5.25" 1.2MB Diskettes, 10 pack. 57200 - \$10.99 5.25" 360KB Diskettes, 10 pack. 57000 - \$4.99

57.440

Et Cetera

G. Now You See It, Now You Don't

This keyboard drawer saves desk space and allows you to get your keyboard out of the way when you need space to think. MacAvenue Keyboard Drawer. 41753 - \$19

H. Let's Keep It Clean, Okay?

Remove hard-to-reach dust and dirt on sensitive computers, diskette drives and monitor screens with Compuduster now 70% more powerful and environmentally safe!

Compuduster. 41023 - \$24

Kleen Keyboard Kit keeps your keyboard spotless. Includes one ounce of cleaning solvent, eight keyboard swabs, and four ounces of Office Duster Jr.™ compressed

Kleen Keyboard Kit. 41019 - \$10

I. Fine Art For Your Mac II

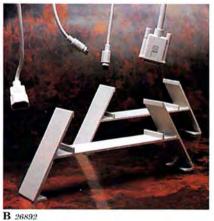
Finally the perfect power control center for your Mac II. Masterpiece organizes your power cords with a special computer outlet, four individually switched peripheral outlets and one convenient master switch. Surge suppression and noise control protect your entire system, and a separate filter protects your modem data from electrical disturbances on the phone line. And if all of this isn't enough, Masterpiece also has a built-in swivel base for adjusting your monitor to that perfect position. Masterpiece Mac II. 26893 - \$103

Keep Your Mac From Wandering The Kensington Security Kit tethers your Mac CPU, monitor, and keyboard so they stay where you put them using Apple's built-in security slots. The kit's unique screwdriver and tamper-resistant screws will lock up peripherals, too. Also fits Apple II GS.

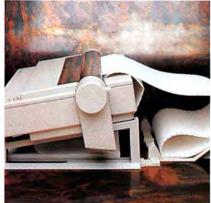
Kensington Security Kit. 26884 - \$33

Extra Long ADB Cable. 26900 - \$24

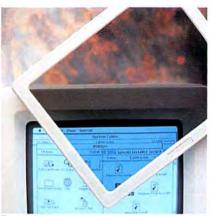








C 26896



D 26882



E 41600,41601



I 26893



G 41753



Software—FASTE

Word Processing



Process Ideas

When it's time to move beyond the realm of word processing into the realm of idea processing, it's time to get Microsoft Word 4.0. With Word, you can design a newsletter from start to finish, create tables without worrying about tabs, and flow type around imported graphics. Cruise through longer documents with the table of contents generator and full indexing capability. With Word 4.0 you can also customize menus and design style sheets to fit your exact needs.

A Junior Partner

If it's just words that make your business, you can get to work super-fast with Write, Microsoft's simple word-processing program that gives you multiple columns, an 80,000-word dictionary, and the ability to put graphics in your text. So simple and so inexpensive you can pick it up in an afternoon.

Microsoft Word.	30582 -	\$245.00
Microsoft Write.	30584 -	\$77.00
AccuText	30608 -	\$543.00
Acta Advantage	30606 -	\$63.00
Big Thesaurus 1.0	30618 -	\$57.00
Findswell	30594 -	\$35.00
FullWrite Professional	30600 -	\$253.00
Micrsoft Word	30582 -	\$245.00
Microsoft Works	30580 -	\$177.00
Microsoft Write	30584 -	\$77.00
MindWrite	30612 -	\$91.00
MindWrite Express	30614 -	\$95.00
More II	30604 -	\$243.00
Nisus	30602 -	\$236.00
OmniPage 2.0	30610 -	\$545.00
QuickLetter	30598 -	\$72.00

Spelling Coach Pro 3.1	30620 -	\$112.00	
Spellswell	30596 -	\$44.00	
WordFinder 2.0	30622 -	\$31.00	
WordPerfect Mac	30590 -	\$183.00	
WriteNow	30588 -	\$107.00	

Database

Into A New Dimension

When you depend on data to keep your business going, your relational database must give you all the power you need — even as your database doubles and triples. If your business is moving in this direction, buy 4th Dimension. 4th Dimension gives you the power and flexibility you need to get the most mileage out of your data. 4th Dimension can create forms, detailed reports, and mailing labels, and can communicate with other machines — all from within the Macintosh interface you already know.

And, when it's time to develop serious, special applications for the power of 4th Dimension, 4th Dimension Runtime gives you more power for your program needs.

4th Dimension.	27780-	\$463.00
4th Dimension		
Runtime.	27782-	\$227.00
Data Desk Professional	27818 -	\$286.00
dBASE Mac	27800 -	\$292.00
dBASE Mac/Runtime	27802 -	\$569.00
Double Helix	27804 -	\$327.00

 Double Helix
 27804 - \$327.00

 FoxBase II
 27790 - \$292.00

 FoxBase II Runtime
 27792 - \$176.00

 FoxBase MultiUser
 27794 - \$385.00

 FoxBase MultiUser
 27796 - \$293.00



Call Today: Hundreds Of Other Titles Available.

Programming

I Think, Therefore I Program
Flash from concept to product in the

blink of an eye. With Think C's fast compiler and linker, programming time shrinks to no time. Devise new applications, DAs, INITs, drivers, or HyperCard functions in this powerful but flexible programming environment. Whether you choose object-oriented programming or procedural programming, Think C will help you build and manage your program with maximum efficiency.

Think C. 27586-\$149.00



Just Enough Pascal	27582 -	\$46.00
MySoftware MailList	27816 -	\$49.95
Prototyper	27588 -	\$183.00
QuickBASIC	27590 -	\$64.00
SuperCard	27580 -	\$127.00
Think C	27586 -	\$149.00
THINK Pascal 2.0	27584 -	\$160.00
True BASIC	27594 -	\$79.00
Turbo Pascal	27592 -	\$67.00

Office Programs

BulkMailer 3.3	27812 -	\$76.00	
BulkMailer Plus	27814 -	\$187.00	
KeyPlan	27810-	\$243.00	
Microsoft Office Bundle	30182 -	\$525.00	
Paracomp Milo	27806 -	\$156.00	
ProVue Panorama	27808 -	\$197.00	

Spreadsheets · ·

Caught In The Crunch

Number crunching used to be dull business, but Wingz makes spreadsheets come alive. Folks who expect spreadsheet programs to handle columns of numbers will love Wingz—it moves numeric mountains! And, as the first graphic spreadsheet, Wingz can also generate

Than A Speeding Pencil...

dynamic graphs and charts — quickly and in 3-D. Use drawing tools from the Wingz toolbox to combine illustrations and clip art into attention-getting reports and presentations. Then resize text fields to add power to the explanations for your figures. Who says numbers have to be dull?



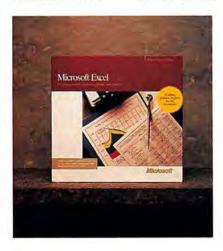
Wingz. Full Impact 30184 - \$245.00 30186 - \$245.00

You Too, Can Excel

Microsoft Excel provides users the power of a fast-moving spreadsheet while it blasts through mountains of data with rocket-speed. Combine the spreadsheet and database with an array of 42 charts, and you have business graphics that will make heads turn at your next presentation. With the built-in macro language you can automate complex, repetitive tasks. And this is just the beginning! Excel also handles complicated scientific, financial, and mathematical functions, supports color display and output, and lets you work on several spreadsheets at once. It's a powerhouse!

Microsoft Excel.

30180 - \$245.00



Utilities

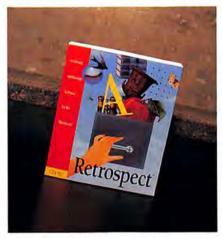


Play It Again, SAM (and Sum)

Stop a hideous virus before it starts with Symantec's AntiVirus for the Macintosh (SAM). On-line help takes the guesswork out of scanning suspicious files or folders. When SAM detects any viral activity inside your Mac, it deletes the deviant code immediately.

Sleep peacefully, knowing your data is safe, with the help of SAM's brother, Sum II, Symantec's Utilities for the Macintosh. Sum II maintains dependable backups, recovers lost data, guards against crash damage, and secures your hard drive from spies.

SAM. Sum II. 30342 - \$63.00 30340 - \$92.00



Have You Backed-Up Lately?

Keep backup and archive files in perfect order. With full LocalTalk network capability, Retrospect handles large storage devices, too, including optical, tape, and high-capacity hard drives. Organize your filing system the way you've always dreamed of with Retrospect.

Retrospect.

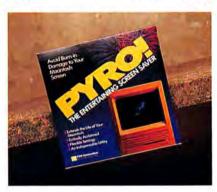
30384 - \$152.00

Born On The Fourth Of July

Enjoy safe fireworks and a safe screen. Pyro! prevents phosphor burnout by replacing your screen image with random visual pyrotechnics.

Pyro.

30398 - \$14.00



101 Scripts & Buttons	30426 -	\$35.00
Affinifile	30350 -	\$44.00
AfterDark	30424 -	\$24.00
Calendar Creator + Mac	30432 -	\$36.00
Calendar Maker	30358 -	\$30.00
CanOpener	30348 -	\$63.00
ClipShare 1.0		\$138.00
Complete Undelete	30420 -	\$36.00
Copy II Mac	30362 -	\$20.00
DiskExpress II 2.0	30422 -	\$54.00
DiskFit	30392 -	\$58.00
DiskLock	30406 -	\$106.00
DiskTools Plus	30410 -	\$31.00
DiskTop 4.0	30354 -	\$63.00
FastBack	30404 -	\$106.00
INITPicker	30374 -	\$26.00
Kiwi Envelopes	30372 -	\$34.00
LaserSpool	30388 -	
LaserSpool 5-pack	30390 -	\$286.00
MacPrint 1.1	30428 -	\$74.00
MacSafe	30370 -	\$85.00
MockPackage Plus Util	30360 -	\$30.00
Network DiskFit	30394 -	\$223.00
On Cue	30408 -	\$35.00
OnLocation	30434 -	\$78.00
PC Tools Deluxe	30364 -	\$43.00
PowerStation	30400 -	\$33.00
Pyro	30398 -	\$14.00
QuickKeys	30356 -	\$62.00
QuickLock	30366 -	\$55.00
Redux	30378 -	\$51.00
	30384 -	\$152.00
Retrospect SAM	30342 -	\$63.00
Screen Gems	30376 -	\$39.00
Shortcut	30418 -	\$45.00
SmartScrap & the	30410 -	Φ40.00
	30380 -	\$45.00
Clipper Suitcase II	30402 -	\$43.00
Sun II	30340 -	\$92.00
Contract Contract In the Contr	30382 -	\$61.00
SuperGlue Super Man Santinal	30396 -	\$86.00
Super Mac Sentinel	30386 -	\$58.00
SuperSpool	30352 -	\$72.00
Tempo	30368 -	\$85.00
The Night Watch	30416 -	\$87.00
TMON	30416 -	\$51.00
Virex	30344 -	\$50.00
XTree Mac	00044 -	φυ.υυ

More Powerful Than A

Communications

The Mail Must Go Through

Install Microsoft Mail in your office and watch communication and productivity improve exponentially! Brainstorm without the meeting, work as a group with no shouting. With Mail you can massage a document, attach a message or a memo, and pass both to your cocreatives for revision without ever touching paper. For accounting or purchasing, you can add custom forms via Mail's HyperCard formbuilder. AppleShare- and TOPS-compatible, Mail uses the LocalTalk network and can serve multi-vendor networks including VAX and PC networks.

Microsoft Mail/Server powers the electronic mail service, stores messages, and allows the network manager to add or delete users and alter network parameters with ease.

Migrosoft Mail

Microsoft Mail -		
Workstation.	27676 -	\$83.00
Microsoft Mail -		
Server.	27678 -	\$246.00
Microsoft Mail		
20 Pack.	27680 -	\$965.00



Carbon Copy Mac	97700	\$119.00
CompuServe Info	21100-	\$119.00
Service	27702 -	\$23.00
CompuServe Navigator	27704 -	\$38.00
Connect	27706 -	\$93.00
Desktop Express	27672 -	\$94.00
Dow-Jones News/Retrie	val	
and Membership	27670 -	\$23.00
InBox Connection	27690 -	\$41.00
InBox Starter	27688 -	\$143.00
In/Out 5-User	27698 -	\$127.00
In/Out 10-User	27700 -	\$187.00
LapLink 2.0	27710 -	\$85.00
Microphone II	27660 -	\$213.00
Microsoft Mail -		
Workstation	27676 -	\$83.00
Microsoft Mail - Server	27678 -	\$246.00
Microsoft Mail 20 Pack	27680 -	\$965.00
NetPrint V.2.0	27686 -	\$115.00

Quickmail 10 Pack	27696 -	\$246.00	
Quickmail 5-User	27694 -	\$165.00	
Quickmail Remote	27692 -	\$32.00	
SmartComII	27662 -	\$84.00	
Timbucktu 3.0	27666 -	\$95.00	
Timbucktu Remote	27668 -	\$123.00	
TOPS for DOS 2.1	27684 -	\$98.00	
TOPS for the Macintosh	27682 -	\$188.00	
TrafficWatch	27674 -	\$127.00	
White Knight	27664 -	\$87.00	
The state of the s			

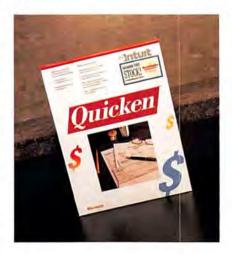
Money Management

101 Macros for Excel	28476 -	\$35.00
Business Sense	28466 -	\$265.00
Checkwriter	28468 -	\$35.00
Dollars & Sense	28464 -	\$78.00
Easy Light MAC	28474 -	\$41.00
Insight AR	28442 -	\$395.00
Insight AP	28440 -	\$395.00
Insight At Once	28454 -	\$283.00
Insight General Ledger	28444 -	\$395.00
Insight Inventory	28446 -	\$395.00
Insight Payroll	28448 -	\$395.00
Insight Time Bill	28450 -	\$395.00
MacMoney 3.5	28478 -	\$58.00
Managing Your Money	28462 -	\$122.00
Quicken	28458 -	\$35.00
StatView II	28470 -	\$285.00
Statview SE + Graphics	28472 -	\$201.00

It's Money That I Love

Bypass painful bookkeeping chores with Quicken, the helpful money management program that costs you less than an hour with an accountant. Keep tabs on your expenses, watch the bottom line of your small business, and track your personal income — simply and easily, and all at the same time. Quicken writes and addresses checks, reconciles your bank statement, and lets you know where you are with the budget. Save yourself the monthly headache. Get Quicken!

Quicken. 28458 - \$35.00



Scheduling



MORE For Your Money

No detail is too small—or too monumental—for MORE II. Juggle several major projects at once. MORE II offers users word processing, outlining, and slide generation as well as handouts for clients. Includes tools to create graphs and charts in color for overheads and printed material. Take your Mac along to impress the crowd with a MORE-II generated, self-running presentation to make MORE of an impression yourself.

More II.

30604 - \$243.00

C.A.T. 29742 - \$225.00 Fast Track Schedule 29744 - \$108.00

Publishing/ Presentation

Adobe Fonts: All 122 ava	ilable	Call
Adobe Illustrator 88	29788 -	\$275.00
Adobe TypeAlign	29826 -	\$58.00
Certificate Library	29810 -	\$17.00
Certificate Maker	29808 -	\$21.00
Cricket Graph 1.3	29806 -	\$113.00
Cricket Presents 2.0	29804 -	\$283.00
EPS Business Art	29818 -	\$73.00
EPS Illustrations	29816 -	\$72.00
FreeHand	29784 -	\$345.00
Letraset ImageStudio	29790 -	\$273.00
Letraset Ready-Set-Go	29792 -	\$273.00
Letraset Studio	29794 -	\$273.00
MacKern	29820 -	\$113.00
PageMaker	29780 -	\$383.00
PageMaker Color Ext.	29786 -	\$133.00
Persuasion	29782 -	\$337.00
PowerPoint 2.01	29798 -	\$246.00
Publish-It	29822 -	\$223.00
QuarkStyle 1.0	29800 -	\$165.00
Silicon Press	29796 -	\$51.00
Springboard Publisher	29814 -	\$107.00
Top Honors	29812 -	\$57.00

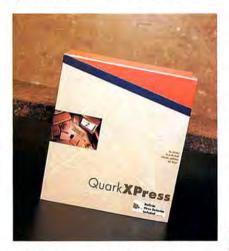
Room Full Of Assistants...

Take The XPress

Quark XPress 2.11.

To get into a publishing environment where you have the power and control you want, grab a ticket on the Quark XPress. XPress gives you exact control over line spacing, kerning, and word spacing. Import text from almost any word-processing program and graphics from any format. Ready for color? Quark makes color separations and uses the Pantone Match System to give you a 16 million-color palette for spot color. And, unlike other desktop publishing systems, Quark gives you both an 80,000 word dictionary for spell checking and a "Search-and-Replace" feature.

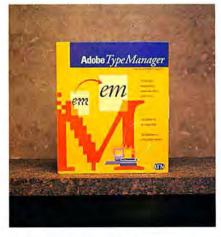
29802 - \$455.00



Beyond The Jagged Edge

Banish forever jagged edges on the bitmapped letters of your screen fonts!! Adobe TypeManager gives you the smooth-edged look of PostScript type while it dramatically improves the output of your non-postscript printer. By eliminating the need to store several sizes of each font, TypeManager preserves valuable storage capacity on your hard drive.

Adobe TypeManager. 29824 - \$55.00





Join The Desktop Revolution

Publish anything — newsletters, books, magazines, even box tops! Documents of any length are a piece of cake with Aldus PageMaker. Imports all sorts of graphics files, kerns type, changes leading, and wraps text manually or automatically around irregular images. Get started yourself in a hurry by using the program's pre-formatted templates, or put Page-Maker in the hands of a graphics genius and — voila — you'll have your own printed masterpiece. PageMaker supports color and accepts almost all word-processing files.

PageMaker. 29780 - \$383.00

Design Graphics

Adobe Photo Shop	29266 -	\$570.00
Canvas	29232 -	\$163.00
Click Art Business	29252 -	\$27.00
Click Art Christian	29256 -	\$34.00
Click Art Holidays	29254 -	\$27.00
Cricket Draw	29234 -	\$136.00
Curator	29264 -	\$71.00
DeltaGraph	29260 -	\$97.00
Digital Darkroom	29224 -	\$248.00
Dreams	29238 -	\$263.00
Electronic Arts Studio/1	29242 -	\$95.00
Electronic Arts Studio/8	29244 -	\$295.00
MacDraft	29240 -	\$143.00
Macromind Accel.	29258 -	\$115.00
Macromind Director	29216 -	\$445.00
Paracomp Model Shop	29218 -	\$378.00
Paracomp Swivel 3-D	29220 -	\$294.00
PixelPaint	29228 -	\$223.00
PixelPaint Professional	29230 -	\$393.00
Smart Art 1	29246 -	\$83.00
Smart Art 2	29248 -	\$83.00
Smart Art 3	29250 -	\$83.00
Super3D	29226 -	\$313.00
SuperPaint	29222 -	\$124.00
Videoworks II	29208 -	\$172.00
Videoworks II		
Accelerator	29212 -	\$99.00
Videoworks II		
HyperCard	29210 -	\$60.00

Present Yourself In The Best Light
Impress your clients, your boss, or just
your friends. With Aldus Persuasion you
can outline your thoughts, develop a slide
presentation, and generate printed
handouts for your audience all at once.
Begin with one of Persuasion's templates,

Begin with one of Persuasion's templates, complete with charts and graphs, or use your own unique format to make believers out of skeptics. You can even produce a self-running trade show demo.

Persuasion. 29782 - \$337.00

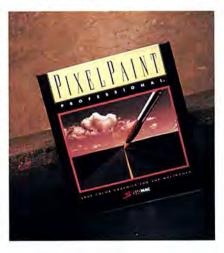
Aldus Persuasion.

Paint The Town

Master the arts of photo retouching and image manipulation with PixelPaint Professional. It takes advantage of 32-bit QuickDraw and 16 million colors. Start a stunning portfolio piece with the amazing airbrush and polish it up with full range of pencil and brush strokes. Or, import a scanned photograph and colorize it, add a drop shadow, and generate special effects. Compatible with all standard file formats, PixelPaint Professional also makes four-color separations.

PixelPaint

Professional. 29230 - \$393.00



Able To LEAP Through



The Luck Of The Draw

Design a logo or a masthead with the host of special effects Cricket Draw puts at the user's command. Wrap words along curves, change fonts and styles in blocks of text. You'll give your messages powerful new impact with graded tints and other features that enable you to handle text in new ways. Incorporate freehand drawings and object-oriented graphics into anything you do. Cricket Draw imports EPSF from several programs, including Adobe Illustrator.

Enjoy the flexibility of objectoriented graphics together with the detail of bitmap painting with Cricket Paint. Any shape, line or texture can be immediately incorporated into your illustration—without the confusion of different layers. Paint outputs in a broad range of formats to almost any printer.

Cricket Draw. 29234 - \$136.00 Cricket Paint. 29236 - \$176.00

int. 29236 - \$176.00

Speller Bee 27984 -\$31.00 28002 -\$30.00 Talking Math Rabbit TimeMasters 27986 -\$21.00 True BASIC Algebra 27940 -\$32.00 True BASIC Calculus 27944 -\$32.00 True BASIC Pre-Calculus 27942 -\$32.00 Typing Tutor 28008 -\$28.00 Unicorn Animal Kingdom 27948 -\$26.00 Unicorn MacRobots \$26.00 27952 -Unicorn Math Wizard 27950 -\$26.00 Unicorn Read-A-Rama 27954 -\$31.00

More Words Per Minute

If the "hunt and peck" method just isn't getting your work done fast enough, Type! will set your fingers flying over the keyboard in a few short sessions. Type! is a program that entertains users while it teaches them how to improve typing skills with each hand — even with each finger. Type! is the result of scientific research on how people actually learn to type; it was designed not only to tell you where your errors are but to teach you to correct them — on the spot — and then build more productive typing skills.

Type! 27958 - \$17.00



Have Fun While You Learn

If you are dragging — one-word-at-atime — through your reading, get a copy of Speed Reader II to increase both reading speed and comprehension in six easy lessons. You will stop wasting time by training your eyes to move more efficiently across a page. Speed Reader II lets you chart your progress with a selection of graphs so you can watch yourself improve.

If someone you know needs a little help with math skills, offer some fun with Math Blaster Mystery, a problem-solving game that covers percents, interest, fractions, and pre-algebra. Designed by teachers and tested in classrooms, Math

Blaster Mystery also develops inductive and deductive reasoning skills while the user solves a mystery.

(P.S. Both Speed Reader II and Math Blaster Mystery are good for adults as well as for kids.)

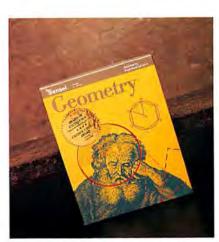
Math Blaster Mystery. 27970 - \$25.00 Speed Reader II. 27972 - \$25.00



Love Triangles

If you've given up on learning the difference between an equilateral and an isosceles, or if the acute angle has finally gotten obtuse, check out Geometry — the program. Geometry is the educational program that can make triangles into friends again. Geometry clarifies abstract concepts through the use of interactive animation. And it won't leave you in the dark when you need a pointer either, because Geometry provides references, explanations, and answers to every problem it poses.

Broderbund Geometry. 27962 - \$57.00



Education

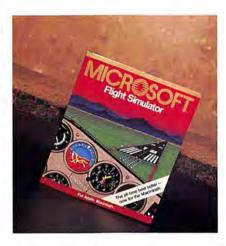
Algebraic Proposer	27946 -	\$44.00
Atlas Explorer	27956 -	\$27.00
Broderbund Physics	27966 -	\$57.00
Broderbund Geometry	27962 -	\$57.00
Broderbund Calculus	27964 -	\$57.00
ConcertWare + MIDI	27998 -	\$98.00
Dinosaur Discovery Kit	27976 -	\$26.00
First Shape	27982 -	\$31.00
Jam Session	27960 -	\$28.00
KidsMath	27990 -	\$25.00
KidsTime	27988 -	\$24.00
KidTalk	27980 -	\$31.00
Math Blaster!	27968 -	\$25.00
Math Blaster Mystery	27970 -	\$25.00
NumberMaze	27992 -	\$25.00
Puzzle StoryBook	27974 -	\$26.00
Reader Rabbit	28000 -	\$30.00
SmoothTalker	27978 -	\$31.00
Speed Reader II	27972 -	\$25.00

90-day no-cost product replacement.

Tasks To Really Astound!

···· Games

Games				
4th and Inches	28692 -	\$26.00		
Ancient Art of War	28668 -	\$25.00		
Ancient Art of War	20000	420100		
at Sea	28670 -	\$25.00		
Apache Strike	28648 -	\$23.00		
Balance of Power 1990	28632 -	\$28.00		
Bard's Tale	28654 -	\$30.00		
Beyond Dark Castle	28646 -	\$23.00		
Chuck Yeager Flight	00070	200.00		
Simulator	28656 -	\$30.00		
Colony Cosmic Osmo	28634 - 28700 -	\$28.00 \$40.00		
Crossword Magic	28638 -	\$28.00		
Crystal Quest 2.2T	28704 -	\$24.00		
Crystal Quest w/editor	28706 -	\$39.00		
Dark Castle	28650 -	\$21.00		
Deja Vu II	28636 -	\$28.00		
Falcon	28614 -	\$30.00		
Ferrari Grand Prix	28684 -	\$31.00		
Flight Simulator 1.02	28702 -	\$31.00		
Fokner Tri-Plane	28682 -	\$23.00		
GATO	28612 -	\$25.00		
Gauntlet Hardball	28642 - 28688 -	\$28.00 \$25.00		
Hidden Agenda	28618 -	\$35.00		
Hunt for Red October	28660 -	\$31.00		
JET	28620 -	\$31.00		
King's Quest 1	28724 -	\$28.00		
King's Quest 2	28726 -	\$28.00		
King's Quest 3	28728 -	\$28.00		
King's Quest 4	28736 -	\$28.00		
Leisure Suit Larry I	28714 -	\$23.00		
Leisure Suit Larry II	28734 -	\$23.00		
Life & Death Lunar Rescue	28658 -	\$31.00		
MacGolf	28624 - 28708 -	\$32.00 \$33.00		
MacGolf Classic	28628 -	\$51.00		
Mac Wizardry	28730 -	\$34.00		
Man Hunter: SF	28722 -	\$28.00		
Manhole (CD ROM)	28698 -	\$34.00		
Manhole	28696 -	\$28.00		
Mean 18	28690 -	\$25.00		
NFL Challenge	28630 -	\$48.00		
P51 Mustang Flight	22222	200.00		
Simulator	28686 -	\$30.00		
Police Quest II	28720 -	\$28.00 \$28.00		
Police Quest II PT-109	28732 - 28610 -	\$25.00		
Quarterstaff	28694 -	\$28.00		
Reach for the Stars	28652 -	\$25.00		
Road Racer	28626 -	\$37.00		
Sargon IV	28616 -	\$25.00		
Shadowgate	28640 -	\$28.00		
Shufflepuck Cafe	28666 -	\$22.00		
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From

Building a workable Mac system is a

the

lot like remodeling a fixer-upper: Just

Ground

when you think you're nearly finished,

Up

along comes Frank the Vandal.

he Macintosh came out more than six years ago, and I seem to have had the builders in my house for almost that long. Someone asked me the other day what they were doing, and I explained that I had been trying to pluck up the courage to ask them that myself.

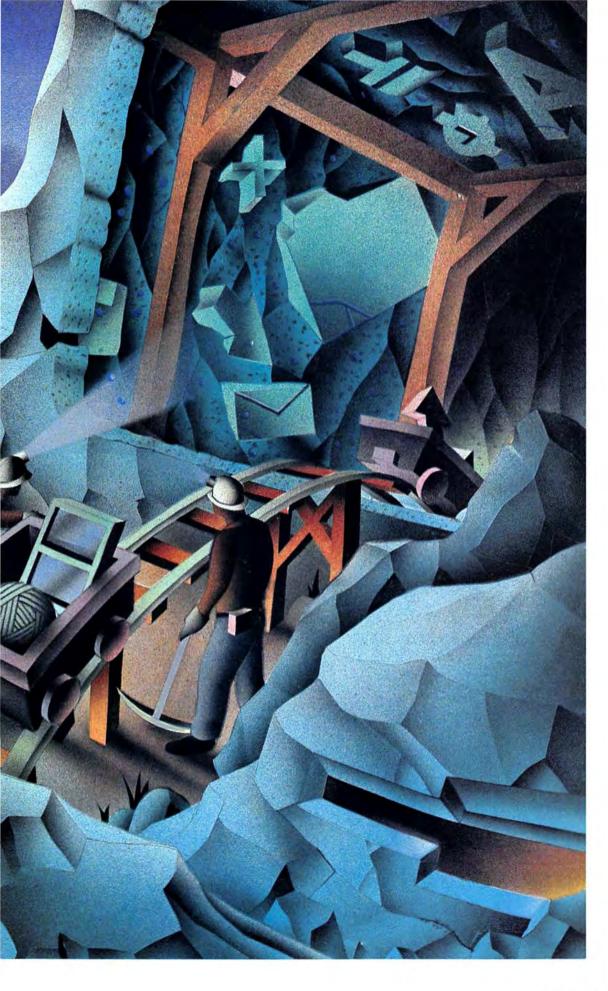
Things are rather complicated by the fact that one of them is an electrician called Frank the Vandal. That is, his friends, if he has any that aren't in the hospital, call him Frank, and I call him Frank the Vandal because every time he needs to get at any bit of wiring, he tends to hack his way through anything else that's in the way to get at it — plasterwork, woodwork, plumbing, telephone lines, furniture, even other bits of wiring that he's put in himself on previous raids.

The house was virtually a complete wreck when I bought it. Not quite as much a wreck as it is when Frank's been here, but nevertheless, it was pretty much an empty shell into which walls, floors, plumbing, and so on had to be put. When the

By Douglas Adams



ILLISTRATION JIM LUDTKE



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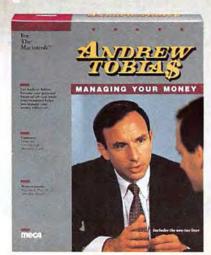
- Macweek, 9/13/88

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From the Ground Up

walls have to be built, a bricklayer comes into the house and builds them. I need floors and stairs and cupboards and things, so a carpenter, whistling a merry carpenter's tune, comes round and plies his trade. Then a plumber comes round and plumbs. Then Frank the Vandal comes round to wrench some wiring into place, and of course the carpenter and plumber and so on have to come round again and make

extensive repairs. I'm going to have to drop the subject of Frank because he's not a part of the analogy I am by slow degrees attempting elegantly to construct. It's just that he preys on my mind a bit at the moment, and it's difficult not to sit here feeling nervous while he's in the house. So — forget Frank. You're lucky. You can.

Now the point is this. The house is here. Building this house is the purpose of the whole exercise. If I want anything done in it, I pick up

the phone (assuming Frank hasn't hacked through the line trying to get at a light switch) and someone comes round to the house and does it.

If I want to have some cupboards installed, I don't have to do the following: I don't have to have the house completely dismantled, shipped up to Birmingham where the carpenter is, put together again in a way that a carpenter understands, then have the carpenter work on it, and then have the whole thing dismantled again, shipped back down to Islington, and put together again so that it works as a house that I can live in.

So why do I have to do that with my computer? Let me put that another way so that it makes sense. Why, when I'm working in a document in one word processor, do I keep on finding that if I want to do something else to the document I have to virtually dismantle the document and ship it over to another word processor that has a feature I need that the first one doesn't? (Why don't

I just use the second word processor? Well, because it doesn't have other features that the first one does, of course.) Or, if I want to put a picture in the document, why do I have to go to another program entirely and do the picture there, and then go through all the mind-numbing palaver of discovering that for some reason the word processor I'm using doesn't know how to handle graphics in that

What I'm talking about is
the death of the
"application." I don't mean
just when they
"unexpectedly" quit; I
mean it's time we simply
got rid of them.

particular format, or claims that it does but then just goes all black and sulky or makes the machine go bing when I actually ask it to. In the end I have to paste all the various bits into PageMaker, which then refuses to print for some reason. I know that MultiFinder has made all of this a bit easier, but it's really just the equivalent of making Birmingham easier to get to, if you follow me.

I don't want to know about PICT files. I don't want to know about TIFF files. I don't want to have to worry about what file type to ask MacWrite II to save my work in so that I can get Nisus to read it and run one of its interminable macros over it. I'm a Mac user, for heaven's sake. This is meant to be easy.

The Mac started out as a wonderfully simple and elegant idea (give them so little memory that they won't be able to do anything anyway), and it's time that that degree of simplicity could be brought to bear on the much, much more powerful and complex system that the Mac has now become.

What I want to be able to do is this:

- 1. Turn on the machine.
- 2. Work.
- **3.** Have a bit of fun, provided I've done enough of **2**, which is rarely, but that's another issue.

When I say "work," I mean I want to be able to start typing on the screen, and if I feel like putting in a drawing,

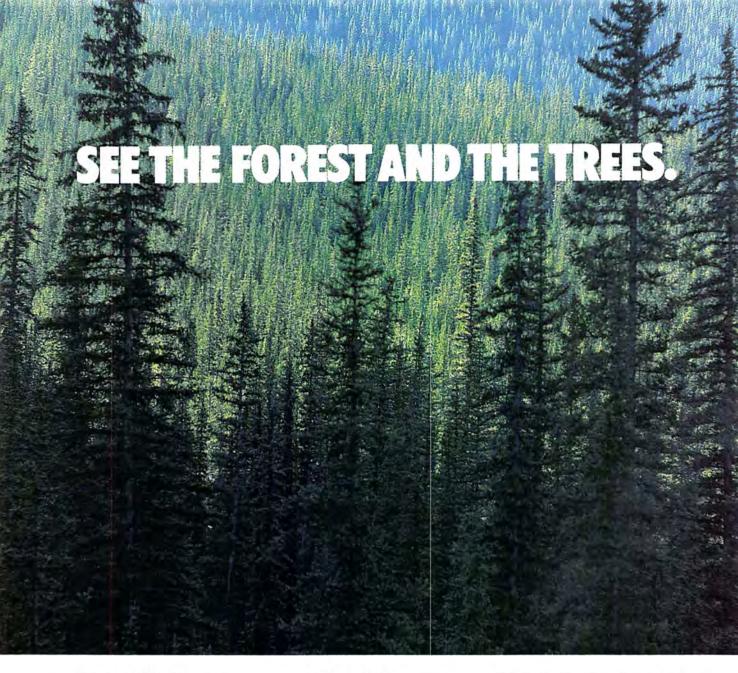
> I draw on the screen. Or I bring something from my scanner onto the screen, or I send something from my screen to someone else. Or I get my Mac to play the tune I've just written on the screen on a synthesizer. Or . . . well, the list obviously is endless. And if I need any particular tool to enable me to do anything complicated, I simply ask for it. And I mean simply. I should never have to put away the thing I'm working on unless I've actually finished it (fat chance, say

my publishers) or want to do something else entirely.

What I'm talking about is the death of the "application." I don't mean just when they "unexpectedly" quit; I mean it's time we simply got rid of them. And getting hold of the tools I need should be as simple as pasting a button into HyperCard.

Ah! HyperCard!

I know it's unfashionable to say this, because a lot of people feel that HyperCard simply isn't powerful enough to do useful work in. It is, after all, a first stab at an idea that's in its infancy. The list of things you can't do with it is almost as long as the list of macros in Nisus. (What are all those things? The very act of pulling down the macros menu causes lights to dim all over North London.) But it's a sensationally good idea, and I would dearly love to see something like it become the whole working environment for the Mac. You want the number-crunching power of



Hidden in that forest you and your co-workers call hard disks is vital information.

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From the Ground Up

Excel? Paste it in. You want animation? Paste in the bits you like of any other animation tools you find lying about.

Or rewrite it.

If it's properly written in objectoriented code, it should be as easy as writing HyperTalk. (All right. You can't write HyperTalk. It should be easier to write than HyperTalk. Just point at the bits you like and click.) We should not have to be tyrannized

by application designers who don't know the first thing about how actual people do their actual work; we should be able to just pick up the bits we like and paste them in.

About Cupboards

I've gone on a bit about electricians. I would like to talk about cupboards. One particular cupboard. It's a cupboard in the corner of my study and I dare not go into it, because I know that if I go into it I will not emerge until the end of the after-

noon and I will emerge from it a sad and embittered man who has done battle with a seething black serpentine monster and lost. The seething black serpentine monster is a three-foot-high pile of cables, and it both taunts me and haunts me. It taunts me because it knows that whatever cable it is that I want at any particular moment to connect one particular arcane device to another particular arcane device is not to be found anywhere in its tangled entrails, and it haunts me because I know it's right.

I hate cables. They hate me too because they know that one day I will simply be able to go into that particular cupboard with a flamethrower and get rid of the lot of them. In the meantime they are determined to extract from me the last ounce of frustrated misery that they can. We do not need the bastards. We shouldn't need the bastards.

Take my current situation as an example. In order to be safe from

Frank the Vandal, I have transferred this article to my portable Mac (I know, I know, you hate me. Listen. We'll all have one in the end. They'll bring the price down, trust me. Or rather, don't trust me, trust Apple. Well, yes, I see your point. Please can I get back to what I was saying anyway?) and have taken the additional precaution of taking it round to a friend's house that is entirely electrically isolated from anything that

I hate cables. They hate
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that one day I will simply
be able to go into that
cupboard with a
flamethrower and get rid of
the lot of them.

Frank may be up to.

When I get back home with the finished piece, I can either copy it onto a floppy disk, assuming I can find one under the debris of halffinished chapters on my desk and then put that into my main Mac and print it (again assuming that Frank hasn't been near my AppleTalk network with his chain saw). Or I can try to do battle with the monster in the cupboard till I find another Apple Talk connector somewhere in its innards. Or I can crawl around under my desk and disconnect AppleTalk from the IIx and connect it to the portable. Or ... you get the picture - this is ridiculous. Dickens didn't have to crawl around under his desk trying to match plugs. You look at the sheer vardage of Dicken's output on a shelf and you know he never had to match plugs.

All I want to do is print from my Portable. That isn't all I want, in fact. I want to be able regularly to transfer my address book and diary stacks backwards and forwards between my Portable and my IIx. And all my current half-finished chapters. And anything else I'm tinkering with, which is the reason why my half-finished chapters are half-finished. In other words, I want my Portable to appear on the desktop of my IIx. I don't want to have to do battle with cupboard monsters and then mess about with TOPS every time I want that to hap-

pen. I'll tell you all I want to have to do in order to get my Portable to appear on the desktop of my IIx.

I just want to carry it into the same room.

Bang. There it is, It's on the desktop.

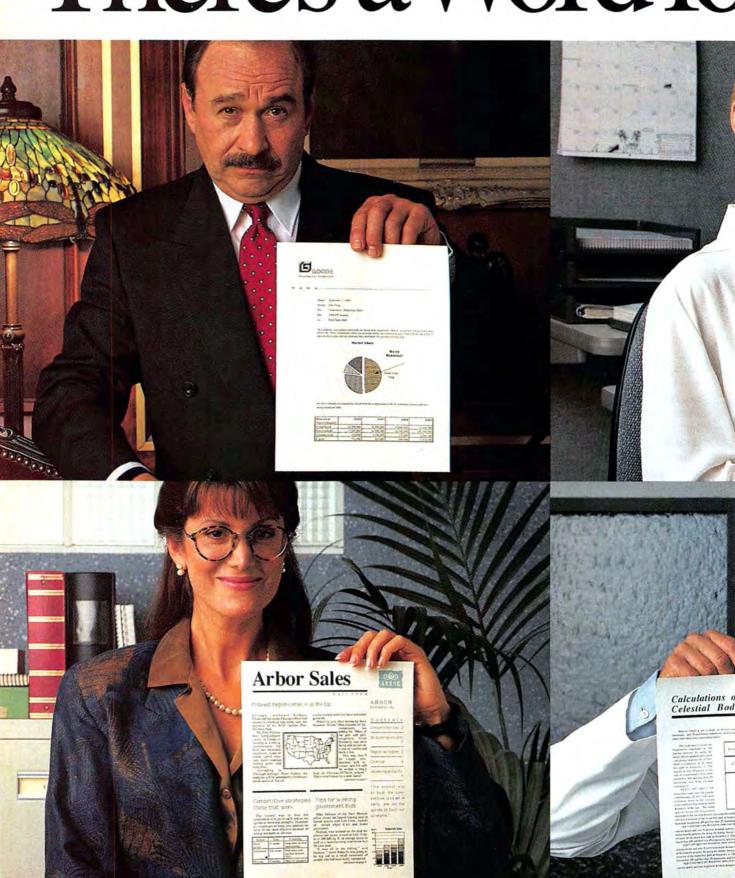
This is infrared talk. Or maybe it's microwave talk. I don't really care — any more than I want to care about PICTs and TIFFs and RTFs and SYLKs and all the other acronyms that merely say "We've got a complicated problem, so here's a complicated an-

swer to it."

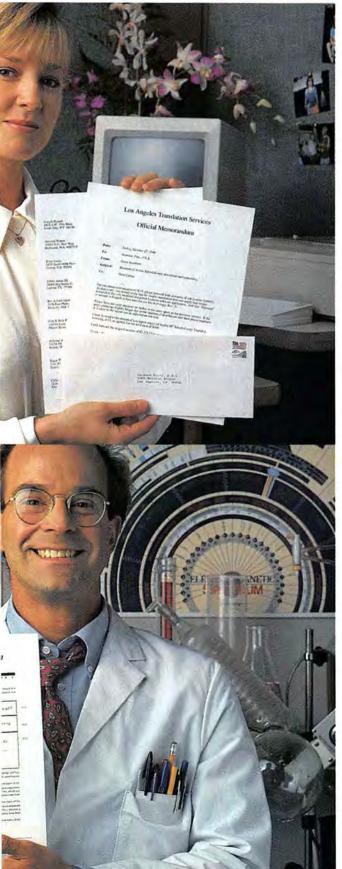
Let me make one thing clear. I adore my Macintosh, or rather my entire family of however-many Macintoshes it is that I've recklessly accumulated over the years. I've adored it since I first saw one at Infocom's offices in Boston in 1983. The thing that has kept me enthralled and hypnotized by it for all that time is the perception that lies at the heart of its design, which is this: "There is no problem so complicated that you can't find a very simple answer to it if you look at it the right way." Or, to put it another way, "The future of computer power is pure simplicity." Somy two major wishes for the 1990s are that the Macintosh systems designers get back to that future, and that Frank the Vandal gets out of my house.

Douglas Adams has authored two trilogies: the four-volume Hitchhiker's series, and the two-volume Dirk Gently saga. The answer is 42.

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Accounting software spans a range from one-write systems for individual users to massive consolidated accounting systems for corporations. We assess the full range of programs and recommend what's best for you.

he Macintosh account-

ing-software industry expanded in 1989.

Several new products,

such as Satori's Com-

ponents and Layered's atOnce!, have made

significant inroads

into the market this year, while older pro-

By Ken Landis

grams such as Chang Lab's Rags to Riches continue to guard their market share.

For new users, trying to pick which accounting system will work best for their business is still difficult. The distinctions among the three market segments - one-write systems, corporate accounting, and consolidated accounting are more blurred than ever.

Choosing an accounting system is not only important to the health of your business; it's critical. Without a solid, functional accounting system, your business will have problems in control, cash flow, inventory, and a host of

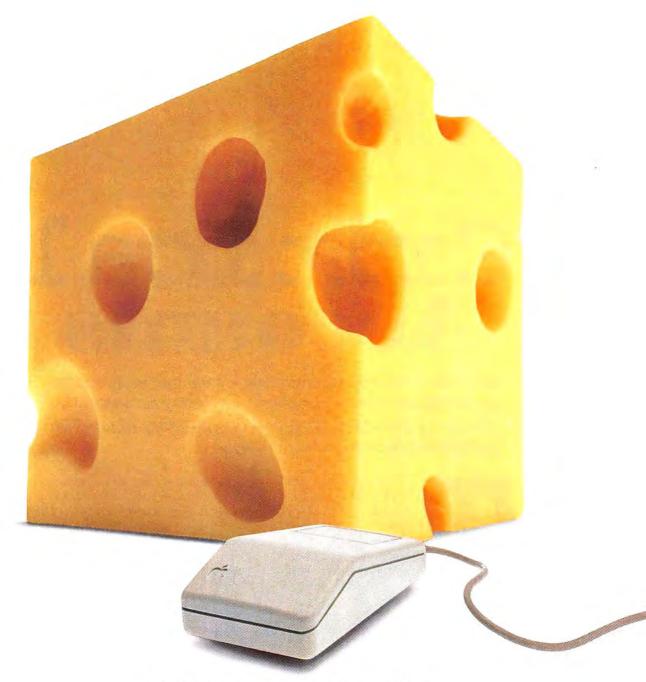
To demystify the accounting-software market, we are reviewing similar packages together. Three market segments split the Mac accounting-software market not by price although the prices for packages in one segment are often alike — but by functionality.

The easiest way for you to zoom in on which suite of software you should evaluate is to read the introduction to each section to learn if that segment applies to your business. If it does, then our capsule reviews of each product will give you a good overview of the market, and our bottom-line results can help you pick the winners in each area.

To choose a system, we recommend that you see a program in action. In most areas, small accounting firms and accountingimplementation consultants can show you how one or more packages work. Many of these firms often install the software for a nominal fee if you buy it from them.

More often than not, the additional cost (these firms usually sell software at list price) is worth the implementation assistance. Installing an accounting system is a time-consuming, critical process that is best left to the professionals.

The performance of your software is governed by its installation. How you set up the chart of accounts, how your reports are defined, and how you link your Mac accounting to your manual-accounting systems all influence the overall performance of your Mac's accounting system. At a minimum, get some feedback from your CPA. Rest assured, he or she is using a computer.



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One-Write Systems

ne-write systems take their name from the manual accounting forms used in many small businesses. Manual systems use carbon or NCR paper to make a copy of all receipt

and disbursement transactions. The Mac versions of one-write systems replace the carbon paper with disk storage and add additional functions such as reporting, automatic batching of recurring entries, and the like.

One-write programs are best suited for small cash-based businesses such as retail stores, sole proprietorships, and professionals who don't need time billing. These programs are characterized by an integrated general-ledger, accounts-payable, and accounts-receivable system. They don't offer inventory, time-billing, job-cost, or order-entry systems, but they do strictly watch where your cash comes in and goes out.

ATONCE! 1.0

atOnce! is an integrated general-ledger, accounts-payable, accounts-receivable, and payroll system for small businesses. The system is designed to work in stand-alone mode for businesses with up to approximately \$10 million in sales.

atOnce! allows multiple

modules to be open simultaneously, so you can enter invoices into accounts receivable and then switch to accounts payable without closing your receivables out.

A helpful aspect of atOnce! is its Inquire feature, which lets you keep lists of such items as your general-ledger accounts, customers, invoices, bills, and employees as a reference guide outside the accounting system. The system is driven by an iconbased application palette that controls your navigation through the four modules.

atOnce! offers 12 or 13 periods per fiscal year with up to 26 open periods stored online. The system also tracks actual versus budget performance for all income and expense accounts. The accounting numbering system uses two- to eight-digit account numbers. The ledger system can handle up to 100 departments and divisions and supports auto-reversing and recurring entries.



atOnce! offers a full set of standard reports as well as a custom report writer. Layered planned to release an updated version that imports and exports data to spreadsheets by early March. The current version requires a Mac Plus or later with a hard-disk drive and System 4.1 or later.

Pros: Accounts receivable uses the open-item or balance-

forward accounting method for the entire company or by customer. Offers a recording feature for handwritten checks. Full-function payroll. Full background printing.

Cons: Can slow down in high transaction usage.

List Price: \$395 Layered, Inc. The Schrafft Center 529 Main St. Boston, MA 02129 (617) 242-7700

PLAINS & SIMPLE 1.05

An excellent one-write system, Plains & Simple is easy to install, has excellent documentation, and is backed by one of the most professional service organizations in the business. The system offers a full generalledger, accounts-receivable, accounts-payable and reporting module. Plains & Simple flows smoothly, makes nice use of the Mac interface, and is as easy to use as manual systems. Its cash receipting is flexible, so that cash can be applied to oldest or specific transactions, for example.

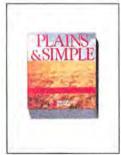
Plains & Simple offers three- to six-digit account numbers that can be expanded at any time. To simplify installation, the system supplies 14 predefined account categories.

Even though it is a low-end onewrite system, Plains & Simple offers a full audit-trail capability. The program works on a Mac Plus or later with a 20megabyte hard-disk drive and requires System 3.2 or later.

Pros: Maintains multiple checking accounts. Provides more than 20 comprehensive reports. Handles multiple company accounts.

Cons: Closes previous year instead of maintaining on-line. Defaults to accrual-basis accounting. No password protection. No report writer.

List Price: \$395 Great Plains Software, Inc. 1701 S.W. 38th St. Fargo, ND 58103 (701) 281-0550



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15" Portrait Display	Radius	Mirror
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Anti-glare	yes	yes
Both screens active	yes	yes
WYSIWYG	no	yes
78hz vertical refresh rate	no	yes
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Cursor sizing	yes	yes
Menu bar sizing	yes	yes
Screen saver	yes	yes
Screen copy	no	yes
One year warranty	yes	yes
Dealer markup	yes	no
Street price	\$1,100*	\$667

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V40 40Mb Hard Drive

How can we sell our New V40 for \$427? This price breakthrough is made possible by new drive technologies and our volume purchases. The V40 drive ships formatted, tested and loaded with 10Mb of software and includes all the features found on our other drives; cables, international power supplies, external SCSI switching, and cooling fan.
One year warranty. Sorry, no dealer inquiries.



20Mb Internal Hard Drive

Sleek, fast, and quiet. International power supply, SCSI switching, fan, and cables are standard equipment. Shipped formatted, tested and loaded with over 10Mb of software. Internal and external models available for most Macs. Two year warranty.

Model	Mb	Int.	Ext.
M20	20	\$337	\$397
M30	30	377	457
M45	45	427	517
M60	60	597	687
M80	80	657	737

(all use super quiet 3.5" drives)



MP-Series 40Mb Internal

These are the premium drives that reviewer's rave about! Similar to the M Series, except our MP Series drives contain the fastest mechanisms in the industry (the slowest of which is 19ms!). Internal and external models available for most Macs. Two year warranty.

Model	Mb	Int.	Ext.
MP40	40	\$ 447	\$ 527
MP80	80	757	837
MP100	100	797	887
MP200	200	1147	1227
MP290	290	_	1997
MP580	580	_	2997



RM600 Erasable Ontical

If you're saving huge files (like 24 bit images, scans, or large data-bases), the RM600 is the right solution for you! Our RM600 erasable optical delivers disk storage at the lowest cost per Mb. We've incorporated second generation technology to bring you the greatest speed and industry-wide compatibility. Full ISO/ANSI compliance. The RM600 incorporates our international power supply, SCSI switching, and whisper quiet cooling fan. One year warranty.



RM42 45Mb Removable

Built around the Eddy Award winning SyQuest technology that has become the defacto standard for Macintosh removable media drives. With an average access time of 20ms, the RM42 is faster than most hard drives! The RM42 incorporates our international power supply, SCSI switching, and whisper quiet cooling fan. Two year warranty.



VS300 Flatbed Scanner

The VS300 delivers crisp line art and dithered halftones at a fraction of the cost of most scanners. Complete with full function scanning software that even allows the VS300 to be used as a desk accessory! Byte magazine said it best: "If it were my money, I'd buy the Mirror . It's price/performance ratio is unequaled." And for a limited time, we're throwing in Zedcor's DeskPaint™ graphics software (\$99 value) and Olduvai's Read It!™ optical character recognition software (\$495 value) at no additional charge!



T150 Tape Backup

Don't settle for a tape backup system that's designed around a cheap audio cassette derivative! Our T150 is a European engineered drive (Siemens of Germany) that packs 150Mb of your precious data onto solid 3M DC600 type cartridges, at 3 times the speed of most competing solutions. And it's painless! Our custom software facilitates automated (unattended) backups, mirror-image, file by file, or incremental backups.



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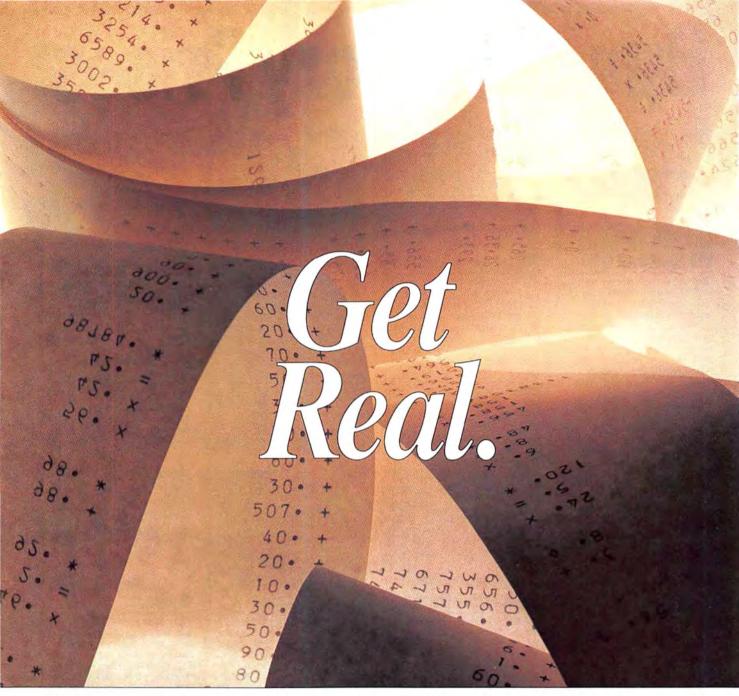
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Introducing Real-Time Accounting for the Macintosh®.

The Macintosh® has always had the potential to be a powerful accounting tool. All you needed was the right software.

Now it's here. Introducing Champion Accounting Software for the Macintosh user. The same features that have made Champion the leading real-time business accounting system in the DOS world are now available to you.

Here are just some of the advantages you can expect with Champion:

- Advanced real-time technology eliminates the need to "batch" or "post". They are done automatically.
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- 24 months "open"—an indispensable feature when a 13th period just isn't enough.

· A CPA perfect audit trail.

- Unlimited description of services for detailed professional billing statements.
- Data security: if your computer goes down, your books will be restored and balanced automatically.
- A built-in expense coding field lets you prepare special customized reports.
 - Source code is available so that you can modify the software to suit your specific needs. Or you may opt to use Champion's custom programming services.

And this is just the beginning. Add up all of Champion's features, and you have everything it takes to turn your Macintosh into a serious accounting tool. For the name of the Champion dealer nearest you, call 1-800-688-8666. Dealer inquiries are also invited.

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Corporate Accounting Systems

he major difference between one-write and corporate accounting systems is that corporate systems use classic double-entry bookkeeping. For each entry, there must be one or more offsetting entries that equal the original entry. In a one-write system, a cash deposit to the bank might be recorded as "Deposit, \$1,000, January 2, 1990." In a double-entry system, an offsetting entry, such as "Received \$1,000, Acme supplies, in payment" would be made, with the proper debits and credits to the right accounts.

Double entry is the key to any corporate accounting system. The system of checks and balances established by the multiple entries is what keeps the books in balance.

Corporate systems are often modular, so they work on an AppleShare or TOPS network

Simply

counting

in a multiple-user, single-entry mode. Unlike true multiuser systems, these systems cannot provide multiuser access to the general ledger, the heart of the accounting system.

In a multiple-user, single-entry mode, users access the same information files, but all the users get their own copy. Thus, any changes made are reflected only in that user's copy. In a true multiuser system, all users access the same copy of a file, which reflects all changes automatically.

Also, in a multiple-user, single-entry mode, each module, such as accounts receivable, accounts payable, and inventory, can operate independently. Then, through a controlled posting cycle, the information from each module is uploaded to the general ledger, where the accounts are maintained and the reports are printed.

ACCPAC BEDFORD'S SIMPLY ACCOUNTING 1.05E

Now owned by Computer Associates, ACCPAC Bedford's Simply Accounting is a solid corporate accounting system that offers full general-ledger, accounts-payable, accounts-receivable, payroll, inventory-control, and job-cost functions.

Simply Accounting is a fully integrated system, so that it automatically passes information from one module to the next. The

system makes good use of the Mac interface, even though its screens look like manual accounting documents.

The system offers a userdefined chart of accounts with flexible four-digit design and can apply entries to prior periods within the current fiscal year. Journal entries accommodate up to 100 accounts, which makes it easy to split accounts. Simply Accounting offers a full audit trail and suppresses zero balances in reports. In accounts receivable, full or partial payments may be tracked. In accounts payable, users may define their own aging periods, and the system retains or purges invoices that are fully paid. The program requires a Mac Plus with an 800K disk drive and 1 megabyte of memory.

Pro: Uses average-weighted-cost method

for inventory. Reports goods on either a margin or a markup basis. Payroll links directly to job cost, handling up to 1,000 active projects.

Cons: No custom report writer or future transaction capability. No recurring entries. Checking account cannot be reconciled on-screen. No discount or finance-charge calculation. No batch corrects.

BUSINESS
SENSE
MONGRAM

Cannot print mailing labels. List Price: \$349 Computer Associates 1240 McKay Drive San Jose, CA 95131 (800) 531-5236 (408) 432-1727

Business Sense 1.3

Business Sense is an easy way to get into double-entry

bookkeeping through a one-write-like system. It does automatic double-entry bookkeeping, reports on two years of data, and displays current running balances. Lookups are made easy through a unique account "remembering" feature. Business Sense has good documentation and uses the full implementation of the Macintosh interface. The program requires a Mac Plus or later with a second disk drive; a hard-disk drive is recommended.

Pros: All entries can be sorted. Does full reporting. Strong import/export capability.

"Six-foot breakers, collisions with distressed vessels, constant dampness friendly, office-computing environment." Robert Hope of the Seattle Fire Department, it takes rugged hardware to weather the operating conditions on the Chief Seattle fireboat. But they've got a security and storage system that definitely has sea legs.

"Bernoulli® is tough," says Hope. "And it has to be. Because our Bernoulli stores critical handling and extinguishing procedures for chemical fires."

"When we're on stormy seas, tied to a burning vessel that has chemicals aboard, our Bernoulli takes a beating. We

don't rely on a hard disk, because if we

it's not exactly a

According to

ever had a head crash, the situation could literally blow up in our faces." Bernoulli is the complete primary

> storage solution. With patented technology, its drives and removable 44MB disks are engineered to last.

> > Their unique design makes them virtually

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head-crash free; and with 22msec effective access time, Bernoulli offers hard-disk performance, without the risk. Bernoulli uses Reed-

Solomon data protection that's 15 times more effective than hard disks. And Bernoulli Disks can withstand 1000Gs of shock without data loss.

> The Chief Seattle crew put those specs to the test. "We dropped Bernoulli 18 inches to the floor while it was accessing, and it kept on accessing," said Hope.

> > "That was all the proof we needed."

Bernoulli comes in both single-and dualdrive, 44MB versions for PC and Macintosh® Its

Robert H. Hope Computer Manager Seattle Fireboat removable disks allow the Chief Seattle crew to store working backup copies of their important data off the ship.



"The best compliment we can pay Bernoulli," Hope says, "is that we've had it on

line 24 hours a day for up to three weeks at a time, without a hitch. That's with fire-fighters who have no prior computer experience. In nearly two years of that kind of abuse, we've never lost a bit of data."

Even if you never have to take your data to sea, you can still secure it to weather the worst. Call 1-800-777-4639 for free Bernoulli literature and specifications. Because there's no such thing as going overboard when it comes to protecting your data.



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Critical Accounts

Uses subaccounts.

Cons: Doesn't store transaction by invoice number. No check-memoing capability. Can cause contention problems when run on AppleShare.

List Price: \$495 Digital Etc. 1749 14th St., Suite 203 Santa Monica, CA 90400 (213) 452-5636

COMPONENTS 1.0 $ttt_{\frac{1}{2}}$

Components is setting new standards in the Mac accounting world, unfortunately much too slowly. Components has two major advantages so far: the complete processing control that it gives users, allowing them the flexibility to post transactions automatically or manually; and the object-oriented report writer that lets users define a report in a seeby-doing, non-programming mode. Components' object-oriented accounting offers maximum flexibility, using a full graphic interface. Users can easily design their own entry journals and reports.

Unfortunately, even with these strengths, Components is incomplete. Only the general-ledger and accounts-receivable mod-

ules were on the market at press time, enough to make an impact but not enough to make a splash. Without the balance of the system — accounts payable, payroll, and inventory — Satori is at an extreme competitive disadvantage. Its competitors are selling products that Satori has only promised. Satori planned to release the accounts-payable module by April, with payroll and inventory modules to follow by the end of summer.

The program works on a Mac Plus or later and requires two 800K drives and System 4.1 or later. A hard-disk drive is recommended. (Note: The five-mouse rating is only for existing modules. As new modules come out, the rating may change.)

Pros: Time-flexible posting and closing routines. Modifiable on-line help. Logos can be easily printed on checks or statements. Users can design entry journals.

Cons: No accounts-payable module. No forecasting capability.

List Price: \$595 per module Satori Software 2815 Second Ave., Suite 560 Seattle, WA 98121 (206) 443-0765



COMPUTERIZED CLASSIC ACCOUNTING 1.3

CCA (Computerized Classic Accounting) from Absolute Solutions of San Diego, California is the first spreadsheet-based accounting template to really make a mark in the industry. CCA is built on

Microsoft Excel, and gives the user all of Excel's benefits while passing on only a few of its disadvantages.

CCA applies the calculation power of Excel to the relatively simple task of maintaining a general-ledger system. It uses a full menudriven command system to control the accounting functions. You can can stay within this menu or drop directly into Excel to do advanced analysis at any time. Custom worksheets or analysis can be easily integrated into the CCA posting system, so virtually any type of account or business can be managed with CCA.

CCA has a full, detailed audit-trail capability and password-protection options for all reports, journals, and ledgers. A fail-safe system prevents common accounting er-

> rors such as defining an accounts-receivable item as an accounts-payable item. The program requires a hard-disk drive, Excel 1.5 or later, and System 6.0 or later.

> (Version 2.2, released after this review was written, works with Excel 2.2, taking advantage of its dynamic links to other database programs. Version 2.2 also does job costing and active payroll

and has increased capability for customization and speed.)

Pros: CCA can keep as many accounting periods open and on-line as you want. Subledgers can be used in any ledger or account. Excel provides unlimited analytic power.

Cons: No context-sensitive help screens. Cannot be run in multiuser mode. User must know accounting and be able to use a power spreadsheet for CCA to reach its full potential.

List Price: Base system, \$395 Absolute Solutions, Inc. 3142 Vista Way, Suite 400 Oceanside, CA 92056 (800) 633-7666 (800) 458-3399 (in CA)

MIND YOUR OWN BUSINESS 1.0 \$\$\$\$\$\frac{1}{2}

An exciting newcomer, MYOB (Mind Your Own Business) offers a lot of punch for very little scratch. The system is an integrated general-ledger. checkbook, accounts-receivable, accounts-payable, and inventory system, Unfortunately,

the system doesn't offer an integrated payroll system, which limits its competitiveness in this category, but it can do just about anything else its competitors can in a single-company

MYOB is a high-powered natural for new or low-powered users. It has a pleasant, intuitive feel, making good use of the Mac interface. It automatically makes recurring entries. The To Do list automatically alerts you to overdue receivables, payables, discounts about to expire, inventory items that need to be ordered, and so on. It's like having a full-time accounting manager watching over your shoulder. Also included is a card file that lets you use MYOB to keep track of everything else in your business. The program works on a Mac Plus with a harddisk drive and System 6.0 or later.

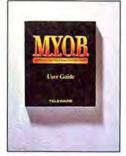
Pros: Compares this year with previous year. Excellent cash-disbursement journal. Automatically generates cash worksheet. Manual inventory reconciliation and reclassifications for manufacturing.

Cons: Appropriate only for use in a single company. No department breakouts. No user-defined aging periods.

List Price: \$99 Teleware, Inc. The Rotunda 22 Hill Road Parsippany, NJ 07054 (800) 322-6962 (201) 334-1154

MultiLedger 1.3, CashLedger 1.3, Payroll 4.1 tttt1

These three products complement each other and are reviewed as a single unit, Multi-Ledger comprises a complete full-function general ledger and accounts-payable, accounts-receivable, and inventory modules. Payroll comes as a separate module. Cash-Ledger is a new product that



uses cash-basis accounting rather than MultiLedger's accrual accounting. Cash-Ledger can be integrated with Payroll.

MultiLedger does batch processing, handles multiple companies, tracks budgets, and combines financial information with PICT files for highresolution statement printing. The program requires a Mac

Plus or later and System 4.1 or later. A harddisk drive is recommended for Payroll and MultiLedger if they have 200 or more users.

Pros: Both cash and accrual accounting are supported. Double-entry bookkeeping is supported transparently. Concise, easily understandable documentation. Complete re-

Cons: No transaction journals. No customer credit limits. Does not calculate finance charges.

List Price: MultiLedger, \$395; Cash-Ledger, \$195; upgrade to MultiLedger, \$200 (files are compatible); Payroll, \$295

CheckMark Software, Inc. 1520 E. Mulberry, Suite 200 Fort Collins, CO 80524 (800) 444-9922

(303) 484-3541

RAGS TO RICHES tttt

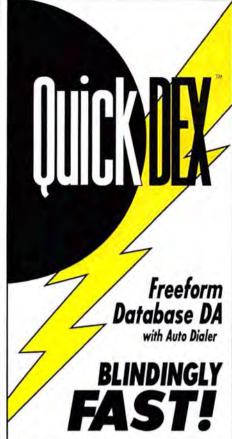
Chang Laboratories has been producing the Rags to Riches series of accounting programs since 1984. Rags to Riches undoubtedly holds the title of "old reliable" in the Mac accounting market. The series has always been highly rated, although it has been

intermittently in or out of vogue.

The latest Rags to Riches release offers general-ledger, accounts-receivable, accounts-payable, inventory, and professionalbilling programs. Rags to Riches has several unique features, such as the ability to

zoom in to, or automatically recall, layers of detail within the system. The system has a clairvoyant search capability, meaning that it can look ahead of your typing for the name of vendors or pavees and then automatically completes the

Rags to Riches also automatically posts entries through its full integration of all the modules and automatically



Instantly find a name, phone number, or text item in 1000+ records. Use QuickDEX for names and addresses, notes, product info, part numbers, employee info, client lists, call backs, phone conversation notes, or all of the above. Quickly find the information you want by typing any fragment of the record. Automatically dial phone numbers with Haves-compatible modems or some Mac speakers. Print mailing labels from QuickDEX files.

Recognized as One of the Top Three DAs of 1989 by Macworld reader survey.

DA with the Highest Satisfaction Rating — Macworld Sept. 88

1988 CES Showcase Award for Productivity



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If that sounds like an outrageous statement, it sure is.

But then, this is one out-

rageous set of utilities.

In fact, comparing the Norton Utilities for the Macintosh to anybody else's utilities for the Macintosh is, well, kind of embarrassing.

Because when it comes to fixing your disk problems, rescuing your data and daily getting the utmost from your Mac," nobody else even comes close.

Why you need a Doctor in the house.

To see what we mean, see what happens when you call up our revolutionary Norton Disk Doctor.®

Which is what you'll do whenever you're having trouble doing things like booting your system, recognizing or reading disks, opening, closing or trashing folders, locating icons or launching

applications.

Instead of displaying something like "Sorry, unable to repair" and sending you to the service center, the Disk Doctor determines the exact nature of the problem, reports it and, in most

cases, fixes it for you. All by itself.

In fact, the Disk Doctor

automatically diagnoses and repairs the 45 most common—and dangerous-problems your disk can confront you with.

> Including a whole bunch of things the other guys can't even detect, let alone repair.

Which is one reason why unlike other programs—we don't display hair-raising messages warning you of the "Risk of losing data" from using our utilities.

We save your trash.

Of course, any time a human being

uses a computer—yes, even a Macthere's a risk of losing data.

Which is why, seven years ago, Peter Norton Computing invented the legendary *UnErase*.

Like the rest of the tools in this box, UnErase has been designed expressly for the Mac, to recover more kinds of trashed files, more quickly and with less effort on your part than any other program.

Instead of just one level of data recovery, we give you three.

You can UnErase by File Type.



We rebuild your reformatted hard disk in a mere nine seconds. That's 52 times faster* than the "competition."

Any resemblance to other Macintosh utilities is pure coincidence.

By Text Search. Or use *Quick UnErase* to scan your fully loaded hard drive in as little as five seconds.

(You don't even want to know how long it takes everybody else.)

Whether your drive is fully loaded or nearly empty, *Speed Disk*™ is—here we go again—the quickest, easiest and safest way to dramatically accelerate disk access.

And unlike other programs, Speed Disk won't lose your data even if your Mac loses power.

Speaking of losing data, when it comes to losing large quantities of it quickly, nothing compares with accidentally reformatting your hard disk.

And when it comes to unformatting your hard disk, nothing compares with our *Format Recover* and *FileSaver*.

Together they not only let you resurrect 100% of your data, they do it in a tiny fraction of the time it takes other programs.

What a find.

Of course, you don't have

have to lose your data to want to get at it as quickly as possible.

That's something you want
to do every day, every time

you open a file.

So you'll be interested to know that *Fast Find* locates and opens files so quickly, you may never use the Mac's standard Find File desk accessory again.

But you'll use our accessories



The remarkable Norton Disk Doctor automatically diagnoses, reports and repairs the 45 most common—and dangerous—disk problems. It even tells you when it's time to run our Speed Disk utility and optimize your Mac's performance.

and control panel devices daily.

If all of this looks too good to be true, see your favorite software dealer for a demonstration.

If you haven't got a favorite software dealer, call us right away at 1-800-365-1010 Ext. 423.

We'll send you more information.





IF YOU LIKE WHAT THE MACINTOSH DID FOR PERSONAL COMPUTING



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MULTILEDGER

An integrated accounting program which combines General Ledger, Accounts Payable, Accounts Receivable, and Inventory tracking. Generates checks, customer invoices, customer statements, and a wide variety of financial and management reports. Prints on ImageWriters, LaserWriters, and many other printers.

PAYROLL

A complete payroll system for organizations with 1 to 1000 employees. Use it as a stand-alone program or integrate it with either of our ledger programs. Calculates both employee and employer taxes and deductions. All state and federal tax tables and parameters are included and all can be modified by the user!

CASH LEDGER

An "entry-level" General Ledger program for those who don't need payables, receivables, or inventory tracking. Shares many of the same G/L features and advantages of MultiLedger, including check-writing, bank reconciliation, and financial reports. Upgradable to MultiLedger if more features are needed in the future.

FROM RECENT

"My favorite all-around accounting program is CheckMark Software's MultiLedger/Payroll set. It was the simplest and most logical I examined that provided a reasonably full set of capabilities. Its price/performance ratio represents an excellent bargain.

Macworld / September 1988

"MultiLedger is ideal for the small business. It's easy to set up and use and has an amazing set of accounting features when compared to other programs that cost more and don't offer much more power."

MACazine / March 1989

"I don't know of any other Mac accounting software which contains so many features and modules for the price.

Computers in Accounting / January 1989

"A welcome and impressive bonus is the Payroll program which can be linked to MultiLedger.... MultiLedger and Payroll are a bargain for companies that don't need a networked system.

MacUser / April 1989

"Our favorite package was MultiLedger.... it's the most elegant, usable and Mac-like of all the packages we reviewed CheckMark offers unlimited free telephone support to all users. This policy would lead to bankruptcy if the program were as confusing as others."

The Macintosh Buyer's Guide / Spring 1989

...You'll love WHAT WE DID FOR SMALL-BUSINESS ACCOUNTING

Easy. Powerful. If you thought they didn't go together, consider what the Macintosh did to redefine personal computing.

It let users concentrate on what they were trying to achieve or produce, while other systems forced them to focus on the operation of the computer itself. The amazing success of the Macintosh shows that when thinking people are given a choice between simplicity and power, they'll take both!

Those who created the Macintosh realized that it takes more time, more work, and more creative thinking to make something simple than it does to make something complicated. Their success has enabled us to create easy-to-use, affordable accounting programs for small and medium-sized businesses of all kinds.

To see if one or more of our programs can work for you, just give us a call. We'll send you a free demo disk of all three programs, reprints of recent reviews, and dealer names in your area.

You'll see for yourself just how easy and painless accounting on the Macintosh has become.



1520 East Mulberry / Suite 200 Ft. Collins. Colorado 80524 Phone 303-484-3541 FAX 303-484-0429

Full-functioning demo disk available

posts finance charges as well. The reporting options are quite detailed yet remain flexible even within their structure. Multiple windows can be open simultaneously, which makes it easy to see the relationships among modules. Opening too many windows can become confusing, however.

The professional-billing module works well for doctors, lawyers, consultants, or any other professionals who bill their customers for time and materials. The program works on a 512K Mac, but Chang Laboratories recommends using at least a Mac Plus.

Pros: Tracks open items and balance forward. Has detailed customer analysis for collections. Tracks outstanding purchase orders by ticket. Inventory module usable for quotations. Supports accrual and cash accounting. Tracks full or partial payments. Can do purchase analyses by vendor.

Cons: No automatic reversals. No recurring or automatic postings. No custom-report capability.

List Price: General ledger, accounts payable, and accounts receivable, \$199.95 each; inventory and professional billing, \$399.95 each.

Chang Laboratories, Inc. 3350 Scott Blvd. Santa Clara, CA 95054 (408) 727-8096

SERVICE INDUSTRY ACCOUNTING 5.38

An Australian firm, Sybiz Software Pty., has taken a stab at developing an accounting system for service industries with its SIA (Service Industry Accounting) program. This is an integrated accounting package that includes an inventory system and job costing for

manufacturing businesses. SIA's market emphasis is small service and manufacturing businesses.

Modules are represented as books, so that it looks familiar to nonaccountants. Each book handles a different set of tasks. The book of job cards, for example, handles estimating, costing, and charging. There is also a ledger book that contains the general ledger, a sales book for receivables, and so

on. The graphic representation makes effective use of the Macintosh's interface — pages are flipped, and the books are literally opened and closed. SIA also generates reorder reports. The

program requires a Mac Plus with 1 megabyte, one 800K disk drive, and System 4.0 or later

Pros: Each book is controlled by a two-level-password security system. Salesanalysis codes allow various sales reports to be produced. Provides direct disbursements from the general ledger. Tracks actual figures versus budget. Does physical inventory count

and variance reporting.

Cons: Cannot consolidate multiple companies. Cannot calculate finance charges or customer credit limits. No recurring entries.

List Price: \$395 Brown-Wagh Publishing 16795 Lark Ave., Suite 210 Los Gatos, CA 95030 (800) 451-0900 (408) 395-3838



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SUPERGLUE II

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802-865-9220, Solutions, Inc., 30 Commerce St., Williston, VT 05495

See us at MacWorld, Booth #727, Moscone Center

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Consolidated Accounting Systems

onsolidated accounting systems are the top of the line in Mac accounting. They are fully integrated, modular, multicompany systems designed to run either in multiuser mode or on a network in a multiuser, single-entry mode.

Consolidated systems' modules can be used in any combination, as long as the generalledger system is always used.

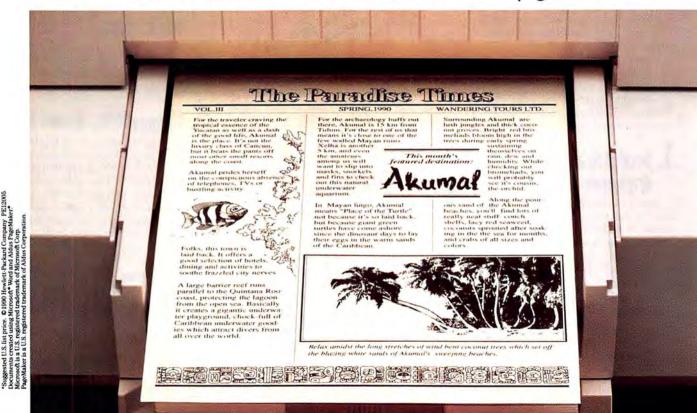
The key aspect of consolidated accounting systems is that they are designed to handle high volumes of processing and data-entry transactions. These systems are typically installed in businesses with more than \$10 million in sales in which the accounting department is divided into accounts receivable, accounts payable, general ledger, and general-

accounting functions such as job cost and inventory.

Consolidated accounting systems are limited only by the size of their disks. No programmatic limits on accounts are set, or if they are, the number is massive, such as SBT's 16-million-customer limit. These systems also provide industrial-strength backup and recovery utilities and built-in archiving features for prior-period data.

The consolidated-accounting market is complex, and the stakes are high. Don't pick a system just because it's the least expensive—choose the accounting system that best fits your business. It's not the cost of the system that you're betting when you buy the system; it's your business.

With the HP DeskWriter, you can



A4 is the first accounting system built on ACIUS' 4th Dimension database engine. Although A4 offers a full general ledger and accounts-receivable and accounts-payable modules, the program definitely takes advantage of the customizable 4D shell, so it could accommodate a lot more modules.

From A4 you get exactly what you would expect from a product based on 4D — batch postings, open-item aging and reporting, cash-flow analysis, profit-center organization, sales and purchase histories by both month and year, recurring transactions, full audit trails, and security and password authorization.

One of A4's major selling points is that users who are 4th Dimension-literate can easily customize the application, as long as they don't mind getting their hands dirty in 4D's procedural language. The full Macinterface implementation of 4th Dimension governs A4's interface, and the accounting package provides unlimited storage and



flexibility. The program requires a Mac SE or later with 2.5 megabytes of RAM and a 20-megabyte hard-disk drive, System 6.0.3 or later, and 4th Dimension version 2.0.10 or later. An accelerator card is recommended.

Pros: Built on the powerful 4D database engine, Easily prints mailing labels. True multiuser system with follow-

up and calendar facilities.

Cons: Limited functionality considering the power of the shell (there is no point-ofsale module, for example). No LIFO (last-in,

first-out) costing in inventory. No payroll system. Can sometimes run slowly, as it is limited by 4th Dimension's speed. Needs to be enhanced to compete against other multiuser systems.

List Price: \$2,000 Softek Design 882 Calgary Way Golden, CO 80401 (303) 526-0606



FLEXWARE 6.02C

Based on the proprietary Flexware fourthgeneration language, the Flexware series is a true multiuser accounting system for the Mac. The system is designed to be installed by an implementer or developer — it is not for off-the-shelf sales.

Flexware provides direct access to the development language for user customization. The development environment offers its own database, which provides quite good performance in high-transaction environments.

There are nine Flexware modules: general ledger, accounts receivable, accounts payable, inventory, job cost, payroll, order pro-

cessing, purchasing, and pointof-sale. The on-line help system tracks your progress and displays information you may need only at the moment. The full implementation of Flexware offers around 200 reports. If that's not enough, users can employ the report writer to create reports.

Flexware can automatically pass data into Excel, which is a very powerful analysis feature.

have it all. (But keep it to yourself.)



The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a \$1,195* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

There is a better way.



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Security is provided down to the field level. The product makes decent use of the Mac interface, but it's not state-of-the-art.

On the other hand, Flexware has a unique double-drive transaction recording and backup system for high-value information. A separate database server-management system can also be installed with the rest of the package.

Flexware is a solid, high-speed, dependable product, but it's just a tad behind Multiuser Desktop Accounting (see write-up later in this article). Flexware lacks user-friendly customization tools, which makes it complex to implement. That's the price it pays for providing a product that can be all things to all people. But if you find a good implementer, the package can be a phenomenal success. Flexware requires a Mac Plus or later with 1 megabyte of RAM, a 20-megabyte hard-disk drive, and System 6.03 or later.

Pros: High-speed system. Unique doubledrive transaction recording. Can be customized for vertical-market uses. Automatically populates Excel or Wingz spreadsheets for analysis or graphing.

Cons: Requires third-party installation

assistance. Customization is developer-, not user-, driven.

List Price: \$895 each, except order processing and purchasing, \$795; job cost, \$995; point-of-sale, \$695

Flexware 150404 E. Valley Blvd. City of Industry, CA 91746 (800) 527-6587 (818) 961-0237

GREAT PLAINS ACCOUNTING SERIES 5.2

Great Plains wins the bulk test. The series consists of ten modules: general ledger, ac-

counts receivable, accounts payable, payroll, inventory, order entry, purchase order, job cost, network manager, import manager, and the analytically oriented executive adviser. Each module has three volumes of documentation — a reference manual, a learning guide, and an orientation manual.

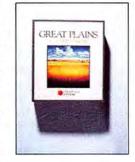
Great Plains looks and feels

like a mainframe accounting system. The designers appear to have been consciously indifferent to the Mac interface. The system runs in a no-holds-barred, go-for-performance mode.

Great Plains offers good functionality for serious users. Unique features such as the ability to track serialized inventory; a point-of-sales entry capability through order entry; recurring, drop-ship, and blanket orders in the purchase-order module; and account numbers of up to 11-digits in the general ledger all reinforce Great Plains' identity as a major accounting system for bigger businesses. Great Plains works on a Mac SE or

later with 1 megabyte of RAM and a 20-megabyte hard-disk drive.

Pros: Financial statements can be tailored. Handles up to 13 accounting periods. Does period-to-period comparisons. Tracks handwritten checks. Calculates up to 239 taxes on inventory in 36 locations. Full audit trails for project-change orders. True multiuser system.



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The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

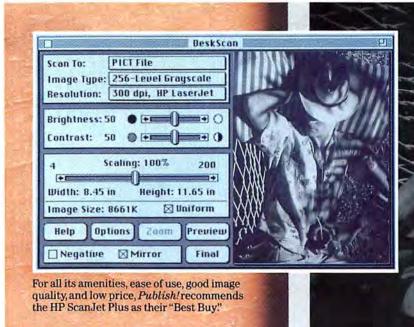
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Excellent order-entry/point-of-sale module.

Cons: Limited use of the Mac interface. No customer credit limits in point-of-sale.

List Price: \$795 each except executive advisor, \$595; network manager, \$995; job cost, \$995; import manager, \$495

Great Plains Software P.O. Box 9739 Fargo, ND 58109 (800) 345-3276 (701) 281-0550

The Insight Series (general ledger, accounts payable, accounts receivable, inventory, payroll, and time billing) offers superb functionality. Each module conforms nicely to the Mac interface and the tempo set by the other modules. The copious documentation is valuable and easy to read.

Insight, patterned after the manual ledger-card concept, conforms well to the Mac in-

terface. It's easy to understand what happens to the cards during processing.

Insight's inventory offers LIFO (last-in first-out), FIFO (first-in first-out), average, and last-cost methods. The systems also provide dynamic and flagged reordering. In addition to standard financial reports, Insight offers a useful set of financial-statement ratios and pie charts that make it easy to interpret the health of your business. Time billing provides employee productivity, multiple billing levels, and methods by project or job.

Insight installs easily; works quickly; and

provides a user-friendly, highpowered accounting platform. The program requires a Mac Plus or later, a 20-megabyte hard-disk drive, and System 4.1 or later.

Pros: Performs full credit checks by customer. Provides customer-profitability reporting. Generates cash-requirements schedules. Has flexible fiscal and reporting periods, separate or consolidated finan-

cial statements by entity, up to 13 accounting periods, and Choice of cash or accrual accounting.

Cons: No on-screen check reconciliations.

No check-memoing capability.

List Price: \$695 per module Layered, Inc.

The Schrafft Center 529 Main St. Boston, MA 02129 (800) 622-4436 (617) 242-7700

MULTI-USER DESKTOP ACCOUNTING 2.05

Built on the Omnis 3 Plus database engine, MDA (Multi-user Desktop Accounting) sets the standards for multiuser performance and accounting functionality in the Mac off-the-shelf accounting market. MDA consists of general ledger, accounts payable, accounts receivable, inventory, sales rep activity, purchases, receipts, sales order/quotes, and invoicing. MDA offers eight user-security classifications, making it the most secure system on the market.

The account-number scheme uses three

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Critical Accounts

components: one for basic account numbers, the second for subaccounts, and the third for department numbers. On top of this is an account-classification system for ranging and determining debit or credit accounts.

MDA makes fair use of the Mac interface, and the switching time between modules is nominal. The sales rep activity module makes managing a sales force a breeze.

Each of the modules is fully integrated and offers a wide range of reports. Data entry is easy, and the package really shows its stuff in high-transaction environments. Logisoft plans to release a version of MDA that's compatible with Omnis 5 by the end of 1990. The current version requires a Mac Plus or later with 1 megabyte of RAM and a 20-megabyte hard-disk drive.

Pros: Works well in high-transaction environments, especially point-of-sale.

Cons: Omnis 3's interface is somewhat lackluster. Payroll is not integrated.

List Price: Single user, \$1,795; up to five users, \$2,795

Logisoft, Inc. 1291 E. Hillsdale Blvd., #205 Foster City, CA 94404 (415) 570-7811

SBT DATABASE ACCOUNTING LIBRARY: SERIES SIX PLUS

Designed as a multiuser system, the SBT Database Accounting Library is driven by the FoxBASE+ database engine. The series consists of the following modules: general ledger, billing, inventory control and open items, accounts receivable, accounts payable and check writing, sales-order processing, purchase-order processing, payroll and labor accounting, manufacturing planning, fixed-asset management, job cost, time and billing, service and equipment maintenance, and property management.

SBT is the only full-range accounting system on the market that is built on a multiuser

database system. The accounting series supports up to 99 companies with up to 999 departments each.

SBT has a nicely implemented audit-trail capability. In addition, the package automatically calculates 20 key business ratios and can handle nonprofit fund accounting in the general ledger.

The inventory-control and



sales-order-processing modules mesh nicely to provide a rich point-of-sale system. Payroll performs as you would expect. The manufacturingplanning module generates bills of material and work orders and reconciles work in process to finished goods.

The job-cost module generates a wealth of management information that includes

cost, budget, variance, percent variance, and under- and over-budget projections. Although somewhat out of the mainstream, the property-accounting module works well. and the service-and-equipment-maintenance module is a nice addition.

SBT requires a Mac Plus or later and System 6.0.2 or later. It works with 3Com, Novell, and AppleShare networks.

Pros: Full multiuser system. Handles multiple depreciation types. Three types of budgets may be generated and tracked. Holds 24-month customer and 36-month item histories.

Cons: Report writer requires patience. Documentation can be cumbersome.

List Price: Each single-user module, \$295; each multiuser module, \$595

SBT Corp. One Harbor Drive Sausalito, CA 94965 (415) 331-9900

WOS FUND ACCOUNTING

Unlike the other accounting systems reviewed here, WOS Fund Accounting is designed to met the unique needs of nonprofit organizations such as governments, school districts, government agencies, and notfor-profit agencies. The system consists of general-ledger, payroll, purchase order/ voucher, and accounts-receivable modules.

WOS Fund Accounting provides doubleentry capability for nonprofit organizations. Multiple fiscal years can be kept open, which is often required by schools and charities: these organizations are the major users of

> WOS. The system handles grant reporting easily and has a specialized module for student billing.

WOS has its own market niche because commercial accounting systems often have to be jury-rigged to fit the needs of nonprofit organizations. WOS doesn't offer all the panache of Insight or Great Plains, but it does provide solid



functionality and good design. The program works only on a Mac Plus or SE with a 20-megabyte hard-disk drive. Farallon is planning to release a version in 1990 that will work on the SE/30 and later models.

Pros: Handles multiple-fund accounting, maintaining GAAP. Encumbrances are easily placed. Multiple-year adjustments, multiple-fund disbursements, and vouchers are sup-

ported. Powerful browse-key functions. Meets most federal reporting requirements.



True multiuser system.

Cons: No recurring entries or transactions. Limited password protection.

List Price: \$4,995
Farallon Computing, Inc.
1321 Wakarusa Drive,
Suite 2010
Lawrence, KS 66049
(800) 843-8101
(913) 843-8101

Ken Landis has been using Apple computers to solve accounting problems since 1978.

The Bottom Line

One-Write Systems



Both Plains & Simple and atOnce! are excellent one-write systems, but when it comes to exploiting the power of the Mac, atOnce! does a better job than Plains & Simple. Great Plains goes for the no-nonsense, straight accounting approach, whereas Layered's development philosophy for at Once! seems to squeeze every last bit of the friendliness out of the Mac. If you want to take the greatest advantage of the Mac's interface, atOnce! will give you your money's worth.

Corporate Accounting Systems

In any market in which there are eight competitors, it's hard to pick an overall winner. As far as the mouse ratings go, Mind Your Own Business, MultiLedger, and Computerized Classic Accounting tie for the top spot with four and a half mice each.

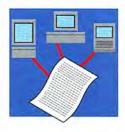
Mind Your Own Business is the winner if you're looking for a functional structured accounting system. The MultiLedger-CashLedger combination takes the cake if you want payroll, and Computerized Classic Ac-



counting is for those with a financial and spreadsheet bent who want not just a bookkeeper but also a business-analysis system.

All the other systems each have something valuable to offer, but one of these three will provide the best fit for almost any business' needs.

Consolidated Accounting Systems



If you're looking for an off-the-shelf multiuser, single-entry system, then Insight is probably your best bet again this year. Insight has taken the Mac interface to the limit. Unfortunately, Insight isn't a true multiuser system, as are Great Plains and SBT, and it doesn't offer order entry. If you need those two features, then consider Great Plains, MDA, or SBT. The latter is the best off-the-shelf multiuser, multientry system, but Flexware does an even better job can if you find a good implementation/development firm.



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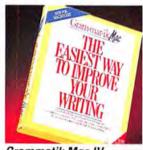
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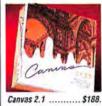
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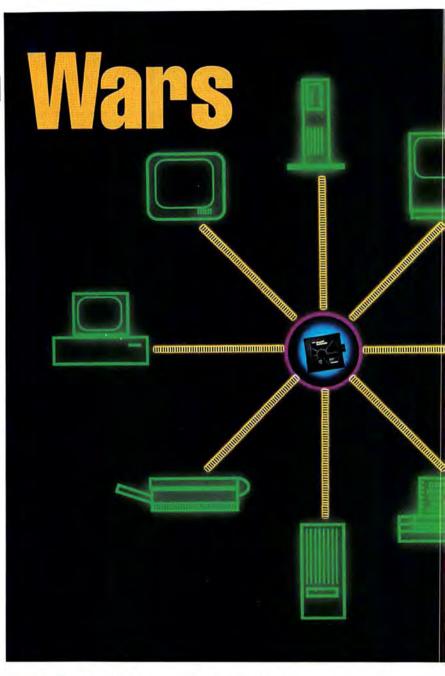
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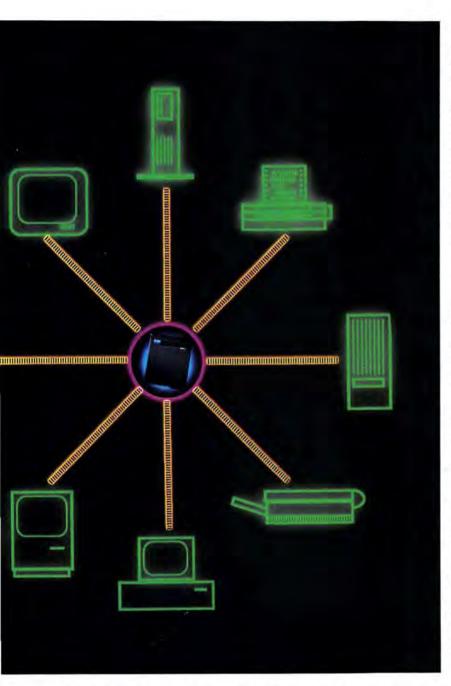
By Kurt VanderSluis

ost AppleTalk networks start small — a few Macs and a LaserWriter hooked together with some connectors and a little bit of wire. Then a few people down the hall decide they want to use that Laser-

Writer, so you throw some cable through the ceiling and connect their Macintoshes to the network. It's not long before everyone in the building wants in, and each Macintosh's signal now has farther to go and more people to serve. Printing is painfully slow, and the network is sluggish and inefficient.

Built-in AppleTalk has made networking so simple that it's easy to forget that small networks have a habit of outgrowing their usefulness — careful network design is crucial





to allow for growth and reliability. One way to cope with your current expansion, as well as to leave room for growth, is to invest in one or more active-star concentrators, which will allow you to expand, enhance, and manage your network.

Active-star concentrators (also known as star hubs) are signal amplifiers installed in your phone closet that have wires running outward to work areas throughout the building. This layout is known as an active-star topology. A passive-star topology uses the same configuration but no concentrator — signals can't travel long distances, and they become progressively weaker as you add more devices to the network.

In an active-star topology, a device, or node, on the network sends a signal, which travels down the wire to the concentrator. The concentrator then amplifies the signal and sends it to another node — the printer, for example.

Because an amplified signal can travel farther, concentrators let you build larger networks than you can build with a passive-star configuration. Because all the wires emanate from a central point, concentrators help keep the wiring orderly and easy to manage. They also provide some management utilities that let you monitor and control the network and find trouble spots quickly.

The Contenders

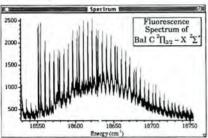
Two LocalTalk active-star concentrators are now on the market: the Farallon StarController, which has been around for about three years, and the Nuvotech TurboStar, which shipped late last summer. Although these two devices perform the same function, they're quite different.

The biggest contrast is the number of ports each has - 12 for the Star-Controller and 16 for the TurboStar. The main advantage of having more ports is that you can allocate wire runs from each port more sparingly. The manufacturers recommend that you run no more than four wires from each port, since a signal's strength is divided by the number of wires a port has connected to it. Having fewer wire runs on each port also gives you better control over each one and makes troubleshooting easier. (It's worth noting that although the Turbo-Star costs about \$500 more than the StarController, the cost per port for each concentrator is nearly the same slightly more than \$100.)

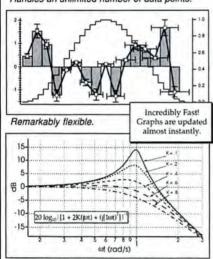
The fact that the TurboStar has more ports than the StarController doesn't mean it can handle more devices. How heavily the network is used—not the number of ports available—determines how many devices you can hook up. If you want to increase the number without compromising performance, you'll have to add a router (see "A Guide to LocalTalk Routers," September '89) or add a higher-speed network such

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Star Wars

as Ethernet (upcoming issues of MacUser will examine Ethernet in detail).

Another major difference between the two concentrators is that the TurboStar has the guts of a computer — it contains a microprocessor chip and a proprietary EPROM (erasable programmable read-only memory). As a result, you can do network management from any Mac on the network, but if the network goes down, your network-management utilities go with it.

Unlike the TurboStar, the Star-Controller is not a computer and therefore cannot be accessed over the network. It uses a direct connection to a single Macintosh, which analyzes the StarController's internal activities.

Each method has its advantages: The TurboStar's network-analysis programs are a little more sophisticated and more convenient to access, because you can do so over the network, but the StarController's method ensures that you always have a separate access pathway, even when the network is down.

Crosstalk

Output voltage is another major difference between these two devices: The TurboStar's output voltage is

+/- 5V, and the StarController's is +/- 3.5 V. The higher voltage enables the TurboStar to send signals over longer distances, but tests in *MacUser*'s NetWorkShop found that the higher voltage also creates a greater tendency toward the electrical phenomenon "crosstalk," which can hurt network performance.

Crosstalk occurs when two signals traveling down different pairs of wire in the same sheath interact with each other. (This is similar to what happens when you play a string instrument — when one string is plucked, the adjacent strings vibrate as well.) With electrical signals, crosstalk is more likely if the signals have similar frequencies and the voltages are strong.

Crosstalk also depends on what kind of cable your network uses (see the "Wire Types" sidebar). Twisted-pair wiring is preferable for networks, because no matter what interference the wires are subject to, the relative voltage between the two wires remains the same, making crosstalk unlikely. Quad and 25-pair cabling also contain twisted-pair wiring, but it only reduces interference from outside the cable and can't prevent crosstalk.

Knowing how your building is wired before you choose a star



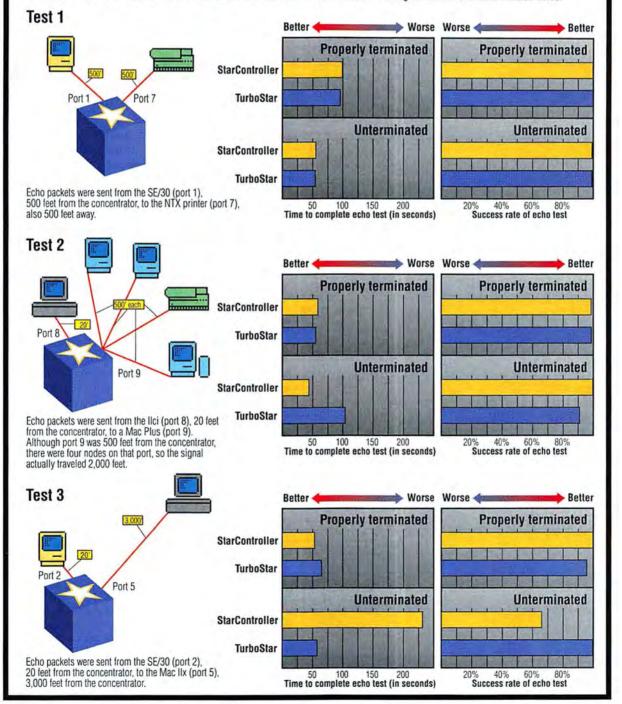
Figure 1: Farallon's StarController (left) and Nuvotech's TurboStar (right) monitor network activity in very different ways: The TurboStar contains a computer that enables it to do network management from any Mac on the network; the Star-Controller requires a direct connection to a single Mac, which analyzes the Star-Controller's internal activity.

We used a point-to-point reliability test to see how well the Farallon StarController and the NuvoTech TurboStar transmit signals on terminated and unterminated wires over distances ranging from 500 feet (for the normal office environment) to 3,000 feet (the maximum length Farallon recommends).

Using Apple's network-management utility Inter*Poll, we sent echo packets from one node on the network to another and then

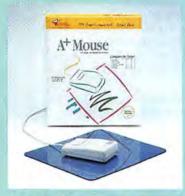
returned the signal to the original node. Inter•Poll evaluated each signal's quality and the time taken for each round trip.

Both star concentrators performed similarly on terminated and unterminated wires of less than 500 feet. The StarController showed a slight performance edge, particularly on short distances with unterminated wiring. The TurboStar performed better than the StarController on long terminated and unterminated wires.



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Star Wars

concentrator is crucial. If the structure contains a lot of 25-pair or quad cabling and you're concerned about the possibility of crosstalk, the Turbo-Star, with its higher voltage, may not be the right choice. In many older buildings in the eastern United States, for example, 25-pair cable is used as the main distribution cable.

You might also encounter crosstalk in a LocalTalk network if you use the TurboStar to connect computers on different floors. When wiring a network, you connect floors with your phone closet's riser cables, made from 25-pair cabling, which increases the likelihood of crosstalk.

Interference between the signal frequencies used by digital phones and those used by LocalTalk can also cause crosstalk if your LocalTalk and digital-phone signals are in the same sheath of wire and your network is wired with quad or 25-pair wiring. This doesn't pose any problems for LocalTalk users, but you may hear some clicking when you're using a digital phone.

Electrical Noise

There are other types of signal disruption besides crosstalk that concentrators need to be able to identify and control.

Two types of false signals can originate inside the network: reflections, which occur when signals echo off the ends of the wire, and jamming, which is caused when damaged devices on the network transmit meaningless electronic jabbering. External devices, such as fluorescent lights or electric motors, can also cause network noise.

Reflections

Reflections occur naturally when a signal encounters a place in a wire where the flow impedance is abnormal, for instance when the wire changes gauge or comes to an end. This causes the primary signal to echo.

Wire ends cause large reflections unless you install terminators that match the wire's natural impedance. Concentrators allow for missing or improperly placed terminators by setting the threshold for an incoming signal so high that only strong primary signals are amplified, and weak reflected signals are ignored. (If the threshold setting is too high, however, legitimate signals from distant devices might be ignored.)

A concentrator can also avoid reflections by "muting" itself — turning off its ports briefly after sending a signal or waiting a certain length of time between signals in order to let the reflections die down.

The TurboStar has a low threshold, and it can't mute itself. As a result, it can hear signals from devices wired more than 3,000 feet away from it (the StarController's recommended distance limit), but it's also more likely to amplify reflected signals. On wires shorter than 200 feet without terminators, it is likely to bounce the reflections back and forth from port to port.

The StarController, which is less sensitive than the TurboStar, sets a higher threshold and mutes itself for ten microseconds after sending a packet, or data block. In *MacUser*'s NetWorkShop tests, the StarController performed quite well with



Figure 2: The main
TurboStar management
window shows configuration data and port conditions. Port 7 shows an
error condition, probably
due to a jamming device.
If the device stops
jamming, the information
will not be updated until
the window is closed and
then reopened.

improperly terminated short wires.

You should always keep your networks properly terminated, but every network manager knows that users occasionally inadvertently move terminators.

Jamming

Another source of network noise is jamming, which is usually caused by a faulty device such as a router or LaserWriter. You can often solve the problem by briefly turning off the jamming device.

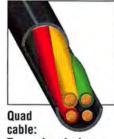
A concentrator can't stop the device from jamming, but it can disconnect its port, which allows the rest of the network to function properly. Any other devices on that port will also be disconnected from the network, however.

Both the TurboStar and the Star-Controller have an antijamming feature that assumes a port is jamming if

Wire Types



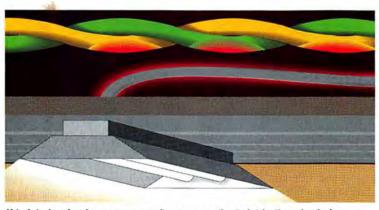
Twisted-pair: Each pair is twisted independently.



cable: Two pairs of wires are twisted together.



25-pair cable: Individual pairs have a slight twist, and then all the pairs are twisted together.



If twisted-pair wire passes a noise source, the twist in the wire balances the noise's effect evenly between the two wires so that the voltage between them is unaffected.

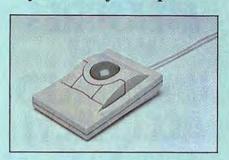
Wire pairs have to be resistant to noise coming from inside the wire as well as noise from other wires in the same sheath. In twisted-pair wire, each pair is twisted independently so that signals from one pair of wires won't affect another pair. In quad wire, however, the two pairs aren't twisted, so they maintain the same relationship to

each other over the length of the cable. If strong signals are sent from different ports down wire pairs in the same sheath of quad cable, crosstalk can occur.

The TurboStar's high voltage will make crosstalk more likely if you use it to link devices on different floors, because 25-pair riser cable is used to connect floors.

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Star Wars

it has been receiving a signal for longer than about 21 milliseconds (the length of the longest permissible LocalTalk packet).

The StarController shuts the port off after 37.5 milliseconds. It automatically turns the port on again after 4 seconds, and if jamming persists, it turns it off again after another 37.5 seconds.

The TurboStar allows jamming to continue for approximately 45 milliseconds before it shuts off the affected port, but it discretely samples incoming signals before turning it on again. If the device is still jamming, it doesn't turn the port on again, but it will activate it once a minute regardless of the port's state.

Activating the antijamming procedure takes less than 1 percent of either devices' operating time.

External Noise

One avoidable source of network noise is having wiring too close to a power source such as fluorescent lights or a generator. Using twistedpair wiring helps avoid this (see the "Wire Types" sidebar).

When you're wiring your network, especially if you're using flat, untwisted line cord, don't pass the wires too close to wiring for other power sources, as this could bring your network to a halt, regardless of which concentrator you use.

Always consult building codes when installing network wiring. It is illegal to install line cord in ceilings and crawl spaces because it isn't plenum-rated (plenum is a special coating that doesn't produce poisonous gases when burned).

Network Management

Nowhere are the differences between the Star Controller and the TurboStar more apparent than in the way they communicate with networks. The TurboStar uses its own computational horsepower for network management, whereas the StarController simply reports network activity to the manager's Mac, which handles the computation and interpretation.

You have to hook the StarController to the serial port of the network manager's Mac to do network management, so you'll need an extra pair of wires at the node where the StarController is installed. Having to devote two extra wires for this purpose can be inconvenient, and it can also be inconvenient to have network-management functions isolated at one machine. On the plus side, however, this setup provides a reliable path that exists independently of the network, and network management continues no matter what disasters occur on the network.

StarCommand 2.0 (now an application, upgraded from a DA) is the StarController's network-management software. Stored in the System Folder, it runs in the background of the network manager's Mac under MultiFinder. It has an updated user interface with one useful new feature: the ability to continuously monitor the state of multiple Star-Controllers on a network and provide notification if conditions change (for instance, if a device connected to one of the concentrators jams). Two separately available Farallon utilities, CheckNet and TrafficWatch,



Figure 3: You access the StarController's management window via StarCommand 2.0 software, which lets you view line errors on the network. Other Farallon utilities, such as CheckNet and TrafficWatch, also help you troubleshoot.

allow the StarController to access network information from any port.

The TurboStar's computerlike configuration allows the network manager to use the LocalTalk network for troubleshooting and maintenance, and the TurboStar's software lets you access information from any node on the network. If the network is extensively damaged, however, the TurboStar's management tools are inaccessible too. You can attempt to make the manager's node as rock-solid as possible by devoting one port exclusively to it, but there is no way to completely safeguard the TurboStar's management utilities from network failures.

Error Tracking

Each device has its own unique management features. The StarController, for instance, can check a port's wiring quality, which allows you to quickly determine if the termination characteristics of that port have changed since you set it up. (For a report on the usefulness of this feature, see "Star Performance," September '89).

The TurboStar makes up for its lack of a line-quality test by maintaining an error log that keeps a running total of packets received and CRCs (cyclic redundancy checks), timeout errors, and overruns on a port-by-port basis. Since CRC errors are usually caused by termination problems, this is just as useful as a line-quality check in determining a port's termination status. (These errors are very rare, however. You should be concerned about this only if there are more than 5 CRC errors

for every 10,000 data packets.)

Overruns and timeouts don't necessarily mean network trouble. If there are more than 500 per 10,000 data packets, call Nuvotech for help in figuring out what's going on.

The TurboStar tells you the activity level of each of its ports and what devices are connected to each port (see Figure 4). This lets you see if your users have changed position on the network without telling you. Annoyingly, however, the main management window doesn't change as network conditions change: You have to close and then reopen the window to get an update.

Useful as they are, neither the Star-Controller's nor the TurboStar's management features can replace the usual toolbox of network-management utilities, such as Inter•Poll, that you need in order to effectively prevent and fix network problems (see "Monitoring Your Network," August '89, for more information on network-management utilities).

The TurboStar's design means that it may have built-in networking and monitoring utilities someday. Nuvotech is keeping a tight lid on plans for the TurboStar, but it would be relatively easy to add a slotted bus that could contain cards for a variety of procedures, management utilities and other tools, and Ethernet and LocalTalk routers. Whether or not all this could be accomplished by upgrading the current hardware is unclear, but the architecture is robust enough to last for the next ten years or so - at least as long as Local-Talk's expected life span.

The StarController, on the other

Figure 4: The TurboStar allows you to view network statistics on a port-by-port basis. Port 11 has many CRC errors, indicating that the port's wiring is probably incorrectly terminated.



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Star Wars

hand, has been on the market for three years with few improvements in its network-management features. However, its setup more or less guarantees that the network manager's Mac is safe from the vagaries of the network's performance, and it also works with more wire types more reliably than the TurboStar does.

Which star concentrator is best depends entirely on your situation, but when it comes to networks, reliability is essential.

Technical Support

Always consider the quality of the technical support and documentation when buying a star concentrator. Farallon has excellent technical support, and the StarController manual is well written and clear.

Nuvotech has been in the market a shorter time than Farallon; has a smaller tech-support staff; and at press time, had only the briefest manual to accompany the TurboStar (the manual is currently undergoing a major upgrade). Time will show how well the firm supports its customers.

Both of these products do the same thing, but they're not interchangeable. Carefully assess your workspace and your future needs before investing in a star concentrator you'll be repaid with both reliability and room to grow. 🔀

Kurt VanderSluis is a MacUser contributing editor.

The Bottom Line

If you're going to buy a star concentrator right now, the Farallon StarController is your best bet. It works reliably with a greater variety of wiring conditions than the TurboStar does, and what it lacks in network-management capabilities - such as port lookup and statistical monitoring, it makes up for in versatility, reliability, and the backing of a company committed to its customers.

The TurboStar has better networkmanagement capabilities than the Star-Controller, and its computerlike design lends itself easily to future developments. Until Nuvotech provides a way to cut back the voltage when necessary and changes the software so that the management window updates when network conditions change, however, I can't recommend the TurboStar.

Capsule Reviews

StarController

*** The StarController distributes network signals to devices on a network and provides some network-management and troubleshooting capabilities. It is

the industry standard and has a good record in most environments. Pros: Very reliable in a variety of typical

wiring situations; has superior documentation and technical support.

Cons: Network management lacks some of the better features of the TurboStar - unlikely to improve.

Requires: Wiring kit (purchased separately or from Farallon) and a connector for each device. Farallon's management utilities (CheckNet and TrafficWatch) must also be purchased separately.

List Price: \$1,295.

Farallon Computing, 2000 Powell St., Emeryville, CA 94608; (415) 596-9000.

TurboStar

The TurboStar distributes signals to devices on a network and has some network-management and troubleshooting capabilities. Its innovative design is compromised by its poor performance in some wiring situations.

Pros: Easy-to-access management and troubleshooting functions. Since it has a proprietary EPROM, it could grow to include management tools, Ethernet routers, and a LocalTalk bridging function.

Cons: Because of its high voltage, the TurboStar doesn't perform properly with some wiring types.

Requires: Telephone-wiring accessories (purchased separately) and a connector for each device.

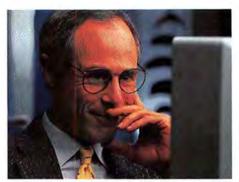
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Nuvotech, Inc., 2015 Bridgeway, Suite 204, Sausalito, CA 94965; (800) 232-9922 or (415) 331-7815.

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The new Macintosh IIfx. Mea

03 of the latter.





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BUYER'S GUIDE

MacUser

COLOR: Techniques & Technologies



When you move into color publishing on the Mac, you enter a work space that is full of promise — and problems. Few other technologies stretch the desktop metaphor to such limits: A dazzling array of sophisticated computer tools is available,

from color scanners and printers to retouching and separation software. But sophisticated digital tools haven't fully solved one of color publishing's central technical issues — what you see on your color monitor isn't always what you get on your color printer. Industry leaders are developing solutions to the problem of color WYSIWYG, but it's still a trap for unwary beginners. Publishing professionals already know that you have to juggle high-tech color tools with traditional publishing techniques.

This MacUser buyer's guide defines the major issues in color publishing and uncovers some of the latest solutions. We start with a trio of feature articles examining the current state of color on the Mac, from input to processing to output. Next, MacUser Labs presents two comprehensive reports on color printers and monitors, with the lowdown on the best products available. All together, they provide a primer for publishers who are thinking of going desktop and in-depth product information for those who've already taken the leap.



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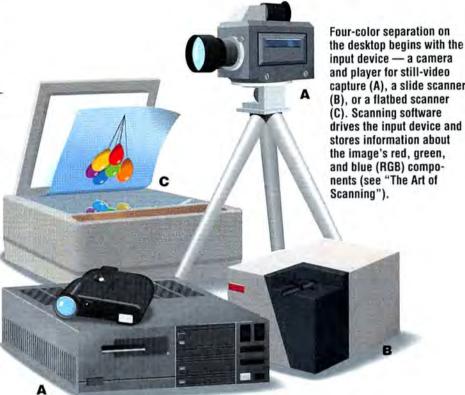
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COLOR: Techniques & Technologies

Color publishing on the desktop is a complex process, from scanning an original piece of art to reproducing the image on a printing press. In three sections — input, processing, and output this article provides an overall map to desktop color. As we examine the software and hardware tools used in the process, we discuss common problems - as well as solutions — both present and future.

By Robert Virkus



ne person can desktoppublish a black-and-white document with relative ease, acting as writer, editor, graphic artist, and production manager. But desktop color reproduction involves a more elaborate scenario. In traditional publishing, film is used at each step - a photograph is taken, retouched, stripped, cropped, placed in a layout, and color-separated.

The Art of Scan

With desktop publishing, computer files replace the film in much of the process, with standards such as Adobe's Post-Script and OPI (the Aldus-sponsored Open Prepress Interface) providing the links. But while computers allow for a degree of precision never before possible, color publishing remains a job best handled by skilled professionals.

The Scanner's Role

The quality of the scanner used at the input stage is crucial. If the scanner fails to capture enough information from the scanned image, the image-processing software and separation utilities cannot entirely compensate for the loss. Fortunately, scanners sensitive enough to provide the full tonal range required for quality reproduction are now being introduced by such companies as Barneyscan, Howtek, Nikon, Sharp, and Truvel.

Scanners convert the light reflected from a photograph into numbers a computer can manipulate. Desktop scanners use a silicon chip called a charge-coupled device, or CCD, to measure the light. When exposed to light, thousands of tiny elements in the CCD emit electrical charges corresponding to the light's intensity. The higher the number of elements in a scanner's CCD array, the higher the resolution of its images.

printer F), which reproduces the image by dithering and making halftones. For the final four-color separation, individual C,M,Y, and K layers are sent to an imagesetter such as a Linotronic (G). The process produces four sheets of film that will create plates for the cyan, magenta, yellow, and black in the finished product (H) (see "Separation Anxiety").

The player or scanner sends the RGB information to a color-video board installed in a Mac running a painting, drawing, or page-layout application capable of color separation (D). The video board displays the image on the screen, where you can manipulate it by using colors you choose with a color picker such as Apple's (E). The software then converts the RGB values of the altered image to the CMYK (cyan, magenta, yellow, and black) scheme that output devices use (see "Color Transformations").

Select a color

Scanners vary in quality according to their resolution (dots per inch, or dpi) and their dynamic range (bits of color captured per pixel). How much resolution you need depends on the size of your original image and output image and the screen frequency you require for color separations. For color separations, you should scan at twice your intended screen frequency to compensate for the information lost when the image is printed as a mosaic of dots, called a halftone.

The scanners discussed here have a dynamic range of 24 bits of color per pixel, which translates to 16.8 million distinct colors - more than enough to capture the image on a color slide.

There are complications, however, In theory, these scanners capture 8 bits of color in each of three passes over an image, scanning for the red, green, and blue components. In reality, they are able to capture only 6 bits. As a result, either

the dark areas go black or the light areas go white. And if you boost the image's brightness after scanning, you lose even more detail in the light areas.

Scanners: Flatbed and Slide

The desktop-color-scanner market is divided into flatbed (reflective-copy) scanners and slide (transparency) scanners. Flatbed scanners typically scan flat art of up to 11 x 17 inches at 300 dpi and 8 bits of data per color channel. Some newer models scan at 600 dpi and 12 bits of data per color for 8-bit color accuracy. Flatbed scanners often have optional mirror attachments that let you scan transparencies, including 35mm slides (scans of slides are often blurry, however).

Flatbed scanners have definite problems providing enough tonal range for quality separations in the output stage. Scanning a slide at 300 dpi renders too little detail. Slide scanners provide

extremely high resolution, considering the size of the 35mm original, but the resolution is still borderline for full-page

Making Compromises

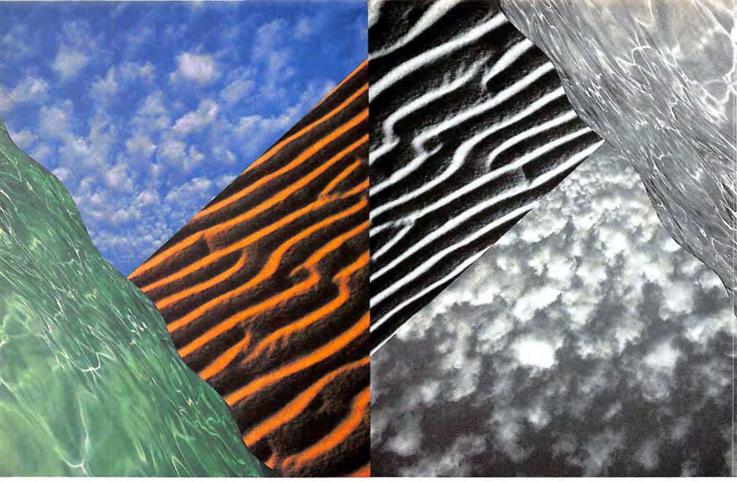
A printing press can reproduce many fewer colors than are possible within a transparency. Certain characteristics of transparencies can be adjusted during the scanning process so that the image reproduced on the printing press best resembles the original photograph. The art of scanning a color photograph involves knowing what compromises have to be made and how best to apply them while still retaining the true colors of the original as much as possible.

Along with color-craft knowledge, operating a scanner requires a certain technical expertise. Color scanners require continual calibration to ensure that the scanner light, mechanics, focus, and

color separations.

H

G



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COLOR: INPIT

filters are adjusted so that the color components will be separated correctly. When checking out scanners, remember to examine the controlling software as well as the technical specifications of the scanner itself.

Controlling the Scan

There are basically two types of scanning software: image-capture software, which controls the scanner and image modification, and processing software, which we'll address in the next section. The current trend is toward dual-purpose software that allows you to adjust the scanning parameters and then scan and modify the image. Some scanner manufacturers provide their own processing software or a copy of an off-the-shelf package such as Avalon's PhotoMac or Adobe's Photoshop. Otherwise, you have to buy your own processing software, which may be preferable anyway.

The key at this stage, though, is having control of your scanner. For quality images, you want to create a scan that looks good from the start. To achieve this, you'll need software with flexible scanning controls. When you evaluate scanners, look for the following features:

Resolution. You don't always want or need the maximum resolution your scanner can provide. You should be able to choose other resolutions, both to keep file sizes down and to fine-tune scans for special situations.

Scan area. Often you'll want to scan only a portion of an image, either to keep the file size down or as a means of cropping the picture. Most scanner software lets you do a quick preview scan and then draw a box around the area you want to capture — an approach that seems to work well.

Disk space and memory. Some scanning software tells you how much space is required for an image before you scan it and whether or not you have enough space to complete the scan. Some software cannot capture an image bigger than available RAM, whereas other programs use available disk space to capture larger images.

Scaling. If you know in advance what size your final image should be, it's useful to be able to scale, or resize, the image during scanning. The trick is not to scale an image to a larger size than what you will eventually use. If you use scaling and resolution control, you stand a much better chance of capturing enough information



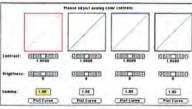


Figure 1: This test photo, scanned on a Howtek Scanmaster, was gammacorrected to make it lighter (right) to compensate for the printing process, which generally darkens images. For the uncorrected image, the gammacorrection curves (in the boxes at bottom) are plotted as diagonal lines.

for making separations later.

Brightness and contrast. You should adjust brightness and contrast before scanning an image, rather than after. When you use image-editing software to change the brightness and contrast, you lose information as you decrease certain values.

For more sophisticated adjustment of contrast and brightness, you can use a method called *gamma correction*. Scanners save color information on a straight 1-to-1 basis, but the amount of information needed to interpret a dark area is greater than the amount of information needed to interpret a light one. To solve this problem, the information is saved on a curve, with more information stored on the dark end of the scale with gamma correction. Instead of using a linear slider to adjust contrast and brightness, you edit the contrast/brightness curve before scanning (see Figures 1 and 2).

Shrinking Files While You Scan

Color scans tend to produce large files
— at maximum resolution, Nikon's slide
scanner LS-3500 produces a 75-megabyte file, for example. And as scanners
improve, the files will get larger. Larger
files have greater spatial and color resolution, giving you more detail and more



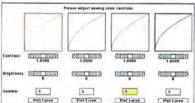


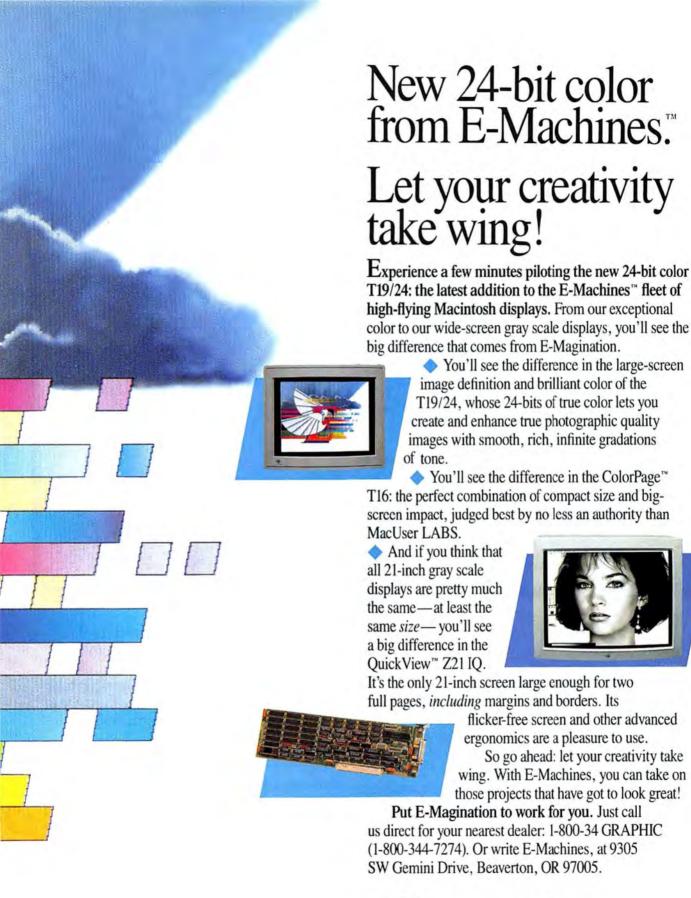
Figure 2: The colors in this gammacorrected photo appear lighter because the curves have been redrawn, so that there are more hues in the lower end of the range (the left side of the box) and correspondingly fewer in the higher end (the right side).

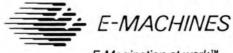
room for image manipulation. Although file-compression utilities such as StuffIt and its commercial version, StuffIt Deluxe, may help when you're transferring images from system to system, on-the-fly compression and decompression techniques will be required to effectively work with color images.

In on-the-fly compression, images are automatically compressed every time you store them and automatically decompressed whenever you want to view them. It usually requires a combination of software and customized computer chips that assist in compression and decompression at high speed. Electronics For Imaging (EFI) produces developer software called ECOMP that does on-the-fly compression by deleting redundant data that the eye won't miss in the decompressed image. The software's adaptive algorithms scan the input image, filtering and preserving its tonal data, color data, and spatial-acuity attributes.

We now have the tools for input at our disposal. The next job is to learn how to use them properly — how to set them up, how to maintain them, and how to capture a good image with the resolution and tonal range required for four-color process separations.







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Photo Mac

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Scanning the Market



The Sharp JX-600 Commercial Color Scanner (not shown but similar: the Sharp JX-450 24-bit flatbed scanner)



Howtek's Scanmaster flatbed scanner



Truvel's TZ-3BWC 24-bit scanner

Flatbed Scanners

Sharp's JX-450 24-bit flatbed scanner scans images of up to 11 x 17 inches with resolution up to 300 dpi. The scanner's software controls resolution, sharpness, scan speed, and image area, and does some color correction. The new JX-600's resolution is up to 600 dpi, and it digitizes the red, green, and blue values for each pixel with 10 bits of data, converting to 8 bits via a table. Sharp scanners don't come with their own software, so you must buy scanning software with a built-in driver, such as ChromaScan, LaserPaint Color II, PixelScan, Studio/8 Scanner Installer, ImageStudio 1.5, or Color Studio.

Howtek makes a version of the Sharp scanner with its own driver, called the Scanmaster, which comes with a full-featured application called MacScanlt. You can adjust brightness, contrast, and gamma for the red, green, and blue layers individually and for some predefined color-correction procedures as well.

The lights and lens of Truvel's TZ-3BWC 24-bit scanner are on a moving arm that rides above the scanner bed, so it can scan three-dimensional objects that are up to four inches tall. Adjusting the lens allows resolutions of up to 900 dpi. The Truvel must be calibrated each time you turn it on, an elaborate procedure. Also, the calibration software is nonintuitive and difficult to get used to. The scanning lights take about 30 minutes to warm up, but if you leave the scanner on all the time, the bright lights become a nuisance.

Slide Scanners

The Barneyscan was the first 35mm slide scanner to approach professional input quality, with a 1,024-element CCD array that captures 8 bits of color per pixel. The scanner comes with Barneyscan-Mac, a basic capture program for scanning, and BarneyscanXP, a

powerful color-correction and paint program.

BarneyscanMac does a quick prescan so you can indicate cropping and adjust brightness and contrast before doing a high-resolution scan. If you change the resolution and cropping areas, the software tells you how big the resulting file will be.

BarneyscanXP, a proprietary version of Adobe's Photoshop that uses virtual-memory techniques, lets you split images into component channels (red-green-blue, cyan-magenta-yellow-black, or hue-saturation-brightness), edit each channel, and then recombine them. The program lets you create masks so you can apply effects to specific regions or values within an image. The Barneyscan is a straight three-pass, eight-bit scanner with limited dynamic range, but the software makes it easy to set the exposure of the scan for optimum values in the areas you want to capture.

Nikon's LS-3500 slide scanner may be the easiest to use, in that it's self-calibrating and focuses automatically. Nikon's Colorflex software examines a slide's tonal range, from dark to light. You can use this preview to set cropping borders and adjust the exposure and gamma controls. You can reduce the size of the resulting file by reducing the resolution (at maximum resolution, the file can be as large as 75 megabytes).

The Howtek Scanmaster 35 scans 2,000 x 2,000 pixels and comes with MacScanlt software. You have to calibrate the Scanmaster 35 every time you turn it on, but calibration is a simple procedure. You can preview an image, choose the portion you want to capture, set all the image-enhancement options, and view the results on-screen. Once the image looks right, you rescan. The preview scan captures 12 bits each of red, green, and blue data and then converts that data to 8 bits, which results in more-accurate color reproduction.



The Barneyscan slide scanner

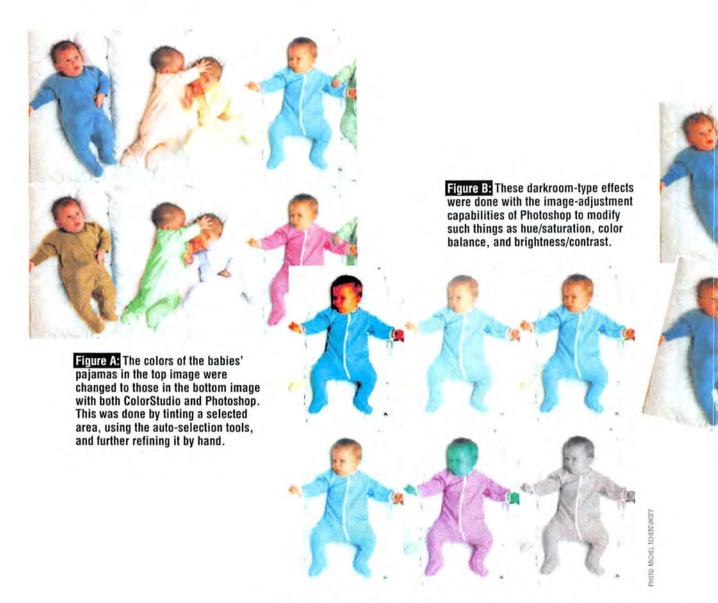


Nikon's LS-3500 slide scanner



Howtek's Scanmaster 35 slide scanner

OLOR: PROCESSING



rocessing color images on the desktop has come a long way in the past few years. The processing tools currently available are so powerful that you can now accomplish tasks that earlier could only be done on million-dollar, high-end prepress systems. With products such as Letraset's ColorStudio or

Color Transfo

Adobe's Photoshop, you can correct your color images and manipulate them in many ways. Color correction involves subtly adjusting an image's color balance, sharpness, brightness and contrast, and other factors, which improves the image's four-color reproduction (see the "Altered Color States" sidebar).

Color manipulation means creating a new image by altering an old one. This can involve anything from darkening the sky so that it's a deeper blue to changing the color of a model's dress to cutting and pasting selected portions of two or more images to achieve a special effect.

Like photo correction and manipulation, mechanical color production is a complex process that involves preparation for four-color separation. Problems arise here because drawing, painting, and layout programs are not consistent in the way they display Pantone-compatible RGB color values on-screen: Artists cannot rely on what they see (see "The



Figure C: The above special effects — including Rotate, Warping, Flip Vertical, and added text — are a sample of what can be achieved with PixelPaint Professional.

Altered Color States

Fixing finished photos can be a nightmare. The darkroom time and the cost of reshooting can push a project over budget or keep corrections from being made. The advantages of scanning photos into a computer and doing the corrections there include instant feedback, advanced and automated tools, and the ability to quickly undo effects you don't like.

The most important features offered by programs that process true-24-bit-color images fall into five categories: selection, color adjustment, touch-up, artistic effects, and output.

Powerful selection abilities are the most important for retouching (see Figure A). Most Mac users are spoiled by paint programs that let them lasso part of an illustration. Although this is simple to do in black and white, it's much more complex for a program to intelligently outline a color selection from within a color image. Both Letraset's ColorStudio and Adobe's Photoshop include powerful tools that let you automatically make selections based on varied color criteria. Since even these automatic functions aren't perfect, they also allow you to add or subtract from a current selection so that you can refine the criteria until the image is exactly as you want it.

ColorStudio, PhotoMac, and Photoshop also allow you to make traditional dark-room modifications — adjusting the contrast, brightness, hue, saturation, and other color-balance aspects in a specific section

or for the whole image (see Figure B).

If an image is damaged, there are touchup features you can use, not just in these programs but also in SuperMac's PixelPaint Professional. You can smudge blemishes, sharpen blurred sections, and blur sections that appear too obtrusive. In addition, ColorStudio, PhotoMac, and Photoshop let you change the color balance of selected images to highlight or de-emphasize items

Professionals can use these programs for special effects that go beyond all but those possible in the most sophisticated darkrooms — adding titles and highlights with color blends and fills — and for showing off special effects such as warping, rotating, enlarging, and reducing (see Figure C).

Little of this work would be of value without a way to get it into print. All the programs mentioned here include the ability to make color separations for final printing. This task is complicated because of the great difference between the colors that can be displayed on-screen and the more limited colors that can be produced by most printing processes (see the "TekColor Solution" sidebar).

The current crop of software for processing true-color images has matured significantly, enabling the Mac to produce results worthy of professionals and giving us one more great publishing tool.

- Ben Calica and Gillian Newson

Pantone Touch" in the DTP section in this issue). Color standardization across applications is a difficult issue that has yet to be addressed by the software industry, but it's an important one if we're going to move any closer to the WYSIWYG ideal.

Color Needs Speed

To do any viable color-image processing, you're going to need a fully equipped Mac II or later. The faster your CPU, the larger your hard-disk drive, and the more RAM you've got, the easier it's going to be to massage large color images. And moving files over a network is less painful with a fast network.

For workable color, five megabytes of

RAM is the absolute minimum — and that may be too confining, since some processing software, and the images they prepare, work only within available RAM. Memory prices have decreased dramatically lately, so the extra \$300 or so to bring your machine up to 8 megabytes will be a small part of your total budget.

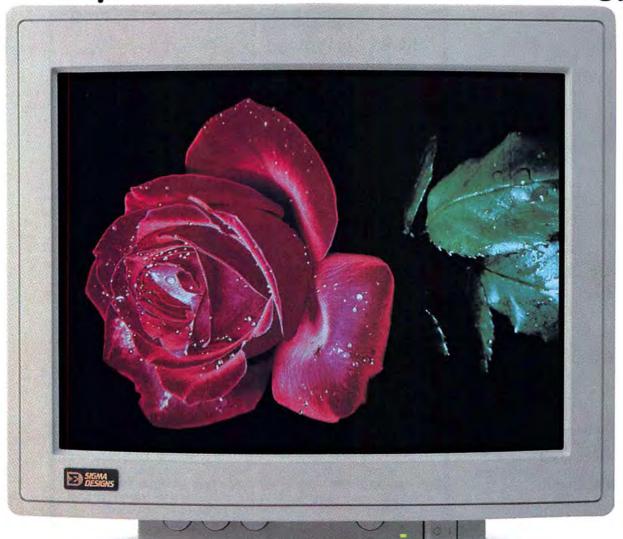
Some software, such as Letraset's ColorStudio, Adobe's Photoshop, and Avalon's PhotoMac, use virtual memory to allocate a section of your hard-disk drive for temporary storage that can be called back into RAM as needed. You can make software that doesn't have this capability more usable on a 5-megabyte Mac IIcx on up by using Connectix's Virtual software. (Apple's System 7

is expected to include virtual-memory capabilities.)

If you are outfitting an older Mac II or find that even the IIci is not fast enough, you may want to invest in a CPU accelerator board, which will make your software run faster. You can also adopt the strategy of buying a video board that's accelerator-ready or that has on-board acceleration, such as the SuperMac Spectrum/24 Series III card with its 32-bit QuickDraw accelerator and support for a wide range of monitors. Other video boards, with various acceleration strategies, are available from companies such as Radius and Truevision.

Video cards that have been optimized for a particular color monitor are often

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COLOR: PROCESSING

part of a display system. Having monitors from the same company for everyone on your production team helps minimize color-display variations among monitors, although without calibration systems such as Radius' or Barco's, the same monitors from the same company, even if purchased at the same time, can display color differently. (See the "Color Calibration" sidebar and the MacUser Labs colormonitor report in this issue for a comparison of color-display systems.)

The Hard Facts

Since color files can be huge, you're going to need a large hard-disk drive. A minimum of 80 megabytes is essential, but you'll probably want something more in the neighborhood of 300 megabytes for backup copies, virtual memory, and multiple versions of an image.

One strategy to keep in mind is to purchase a removable disk drive, such as those available from Bay Microsystems, Mass Microsystems, Microtech, DPI. Peripheral Land, Info Technologies, and Relax Technology (see "The Never-Ending Storage," March '89). Because you have to transfer your files to a service bureau for processing and modem transfer can take too long, even at 2,400 or 9,600 baud, make sure that your service bureau can support the device you're planning to buy, since universal standards for this medium don't exist yet. (Some service bureaus, as part of your contract, supply the removable disk drive themselves.)

You may also want to look into purchasing a removable, erasable optical drive, which is capable of storing up to 1 gigabyte on a single cartridge (see "Letting in the Light," November '89). Manufacturers include Storage Dimensions, Peripheral Land, Pinnacle Micro, Jasmine, LaCie, Racet Computes, and MACsetra.

Networks That Work

You're going to find passing color files around within a work group a bit slow on a network with LocalTalk (230K bits per second [Kbps]). To speed up the process, you can outfit your Macs with DaynaTalk or FlashBox connectors from Dayna Communications or TOPS to theoretically achieve LocalTalk speeds in the 700-to-800-Kbps range, but an Ethernet network, capable of speeds of 10 megabits per second, is a better choice for heavy traffic.

Color Calibration

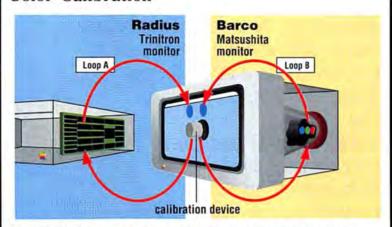


Figure D: The Radius and Barco calibration strategies both use optical sensors to adjust colors on a monitor, but there the similarity stops. Radius adjusts the video card's output levels (Loop A) to account for color drift, whereas Barco adjusts the monitor's settings (Loop B) against the original factory specifications. An ideal calibration scheme would let you make both adjustments to ensure more-stable on-screen color.

One of the first steps in moving closer to WYSIWYG color on the Mac desktop is to make sure your monitor is displaying consistently accurate colors. This is no simple task. Two companies, Radius and Barco/RasterOps, have come up with a couple of innovative methods for tackling the tricky issue of color-monitor calibration.

The Radius PrecisionColor Calibrator calibrates the video card to produce predictable and accurate colors. The Radius system uses a combination of proprietary software and an optical sensor that attaches to the ADB (Apple Desktop Bus). A sensor clamps onto the screen with a suction cup and reads the red, green, and blue phosphors' intensity levels. The software then analyzes the monitor's response to output from the video card. If the monitor doesn't show the desired contrast and brightness, the video card's output is adjusted until the monitor shows the desired results.

This system guarantees that your Radius monitor will have the same response as do all calibrated Radius monitors. It also provides several settings for different scanners and printers. In addition, it allows you to adjust the color temperature, or the monitor's "whiteness."

The missing equation in the Radius system is the monitor's reliability. Radius is banking on the consistency of the Sony

Trinitron, which, although one of the best in the industry, is not perfect.

Barco has addressed the monitor-reliability problem by marketing a calibrated monitor, sold in the U.S. by RasterOps. Like Radius', the Barco Calibrator also uses an intensity sensor and offers color-temperature adjustments. But instead of creating a feedback loop to the video card, the Barco Calibrator loops its feedback to a processing system within the monitor. Data from the optical sensor is used to maintain consistent response levels from the phosphors. This ensures the stability of the monitor and color for a long period of time by correcting for amplifier drift, aging phosphors, and environmental changes. Because this correction is constant, a Barco monitor is theoretically always calibrated to its original factory specifications.

The Barco Calibrator is handicapped by having no feedback to the video card, which can be inaccurate by as much as 10 percent. Another problem is that the Matsushita Shadow Mask tube that Barco uses is inferior to that of Radius' Trinitron in focus, brightness, and uniformity.

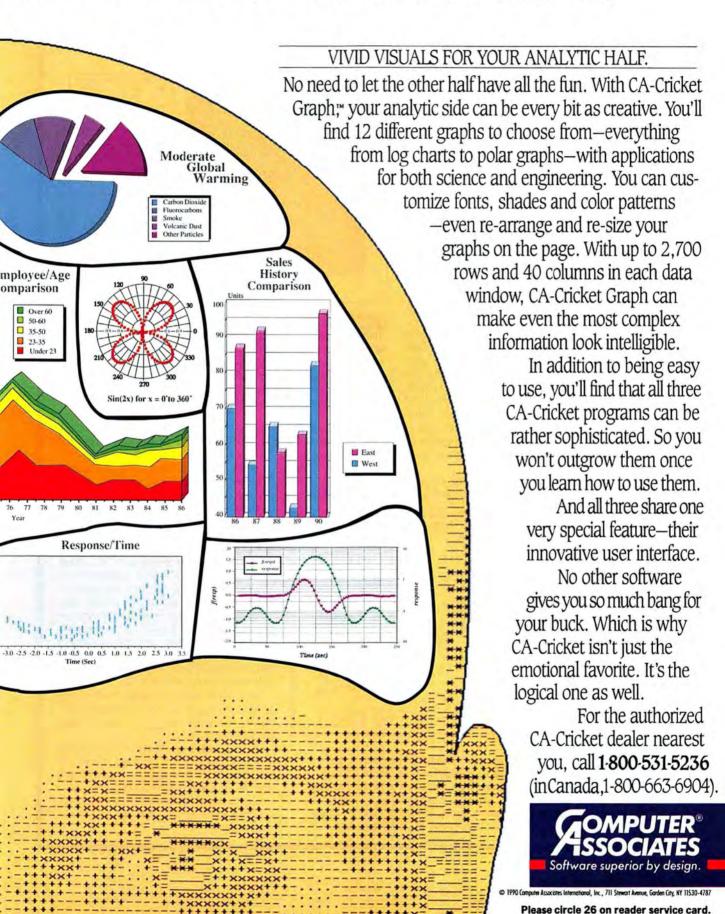
So what is the best calibration scheme? The jury's still out, but some combination of both products, giving you correct signals from the video card and a stable monitor, would be ideal.

- Paul Yi

CA-Cricket Appeals To Any



one With Half A Brain.



COLOR: PROCESSING

The TekColor Solution

A perfectly calibrated monitor gives you consistent colors, but since backlit monitors show colors differently than does the printed page, how do you precisely translate a monitor's color values to those of your printer?

The problem lies in the fact that monitors use an additive system to create colors: Red, green, and blue (RGB) are added together in varying percentages. A printer, on the other hand, uses a subtractive system — various mixtures of cyan, magenta, yellow, and black dyes (CMYK) subtract colors from the spectrum when reflected from paper to the human eye. Because of the difference between additive and subtractive color, there are many colors that a monitor can reproduce that a printer can't and a few colors that a printer can reproduce that a monitor or printer can reproduce is called its color gamut.

One manufacturer, Tektronix, has come up with one of the best solutions to this dilemma with its product TekColor. It shows great promise for WYSIWYG color.

The first step Tektronix took was to determine the gamuts for several monitors and match them to gamuts of specific printers. Currently, Apple, E-Machines, Radius, and RasterOps monitors and Tektronix Color-

Quick and 4693DX color printers are supported, with more to follow. Because it accesses tables that map the full color gamuts of these monitors and printers to each other, TekColor can track displayed colors against those that will print.

TekColor comes as a cdev that replaces the Apple Color Picker. When you choose colors to display, a dialog box (see Figure E)

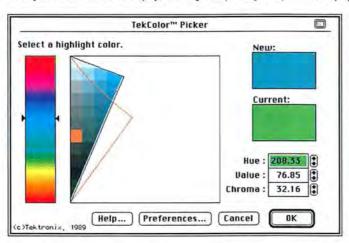


Figure E: The TekColor Picker, a replacement for Apple's Color Picker, maps the color ranges (gamuts) of monitors to printers. Where the monitor leaf (in color) overlaps that of the printer leaf (outlined), you can select colors you can display as well as print. Moving up and down the hue bar, you change the leaves' shapes and area of overlap and, thus, the colors common to both.

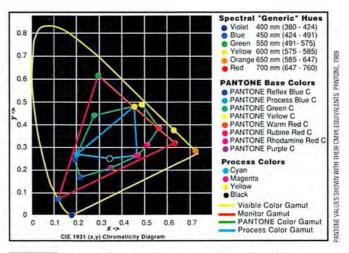


Figure F: This diagram shows the RGB, CMYK, and Pantone models mapped to the CIE standard along x and y axes (z is not shown). This figure demonstrates that the various color models comprise a more limited range of colors than what humans can see. But mapping various systems to one true color model shows that any color can be specified by a single set of coordinates, regardless of the device or medium it's displayed on.

shows the gamuts of both the monitor and the printer as two triangular, overlapping leaves. Each device can reproduce the colors of the other *only* where they overlap.

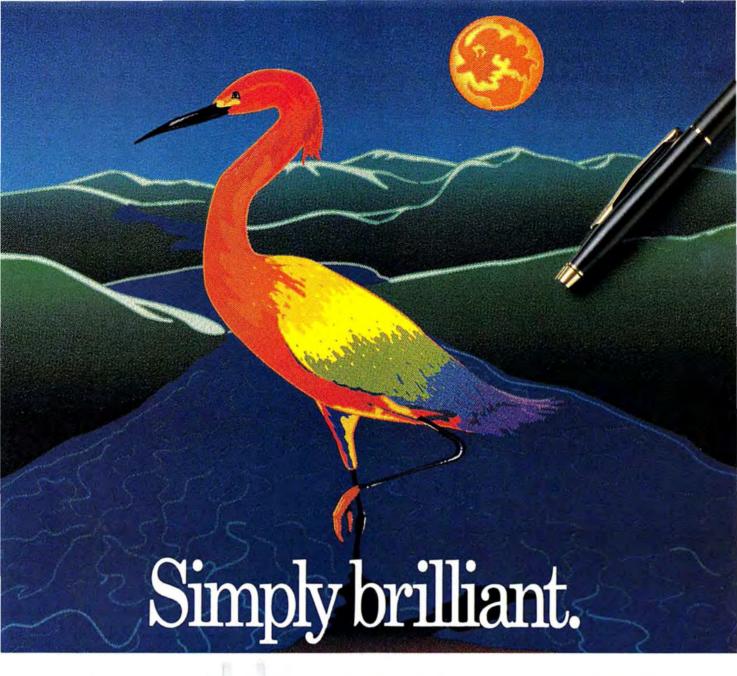
Additionally, TekColor assures the conversion of RGB values to CMYK values for specific devices. Most current applications on the Mac employ an RGB model to display colors and a corresponding

CMYK model to print them but assign only generalized RGB and CMYK values when the program displays or prints a color. These models make it appear as though a specific monitor or printer is capable of displaying and printing all RGB and CMYK values, which is not the case. (The issue is complicated by wide use of the Pantone color-matching system for predictable spot-color output.) This becomes obvious when RGB and CMYK models and the gamuts of particular devices are mapped against Tektronix's color model, TekHVC (hue, value, chroma), which is a version of the CIE color model developed in the 1930s to mathematically define the range of colors that humans can see (see Figure F).

TekColor can assess the limited gamuts of each particular device and accurately convert their values. This is all done on the fly as the image is being rasterized and processed.

By using TekHVC as an objective color model and mapping the gamuts of monitors and printers to it, TekColor theoretically guarantees true WYSIWYG color. Although devices still need to be calibrated to account for drift, TekColor moves us one revolutionary step closer to the WYSIWYG ideal.

- Paul Yi











4693 DX



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ew developments notwithstanding, to date there is no such thing as true-color WYSIWYG. Even the monitor on a \$1 million Scitex system doesn't accurately represent what images will look like when they're finally printed. Operators have to depend on their skill and judgment in knowing what variations may occur and how to compensate for them.

Separation Anxiety

As a result, color-publishing experts aren't going to find themselves out on the street just because the Mac can make color reproduction easier; in fact, their services may be even more valuable now, and possibly less expensive. The potential for producing sloppy color on the desktop is immense. With powerful tools such as color-retouching and -separation software, unskilled users can botch an

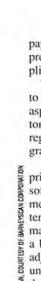
image as easily as they can enhance it.

Because color reproduction is difficult, requiring extraordinary control over every variable, it's vital that you learn as much as you can about every facet of the process. Your best educational tool may well be your prepress vendor, who has learned the trade by using traditional methods and has a wealth of color knowledge to draw on.

Color Halftones

Four-color printing requires separating an image into four halftones — cyan, magenta, yellow, and black — each of which is assigned a proportional value of its color. Since printing presses can print ink only at full intensity, photo processing uses halftone screens to produce a pattern of large and small dots representing intensities of color.

Printing four halftones on top of each other is not an easy task — inks aren't perfect, film shows color differently than





paper, paper absorbs ink at different rates, presses apply ink differently...the complications go on and on.

To create quality separations, you need to be able to control some or all of these aspects as well as several technical factors such as screen angles, dot gain, traps, registration, under-color removal, and gray-component replacement.

You can start your education in color printing by learning how your processing software deals with these factors. Experiment with the program's default parameters, and then output some film without making any corrections, to give yourself a base from which to work. Gradually adjust the various settings, one at a time, until you get a feel for what the controls do and how they affect your output.

Screen Angles

When the dots in each color are origented the same way or at an acute angle, the result is an undesirable moiré pattern in the printed image. To avoid this, each halftone screen must be rotated at a slightly different angle. Typical rotation values for each screen are 105 degrees for cyan, 75 for magenta, 90 for yellow, and 45 for black

Color-separation software should allow you to precisely adjust screen angles by rotating each individual layer in singledegree increments.

Dot Gain

Dot gain is the enlargement in dot size that occurs in any printing process. Depending on the type of paper, the original film's dot size can grow as much as 15 to 30 percent. Because it absorbs ink, uncoated paper, such as newsprint, results in the greatest dot gain, whereas coated paper, such as the kind MacUser is printed on, results in the least.

The amount of ink used during printing also affects dot gain. As more ink is printed, the dot size becomes bigger, increasing the contrast and darkening the color. On the other hand, too little ink lowers the contrast and detracts from the reproduction's quality. The optimal amount of ink depends on the paper used and the particular tendencies of the printing press used.

Dot gain doesn't affect all the dots in a halftone to the same degree — it tends to be greater in the middle tones, where the dots create 50-percent shades, than in the highlights and dark areas. This results in darker middle tones, which reduce the contrast and detail and make the picture look darker.

Registration

Registration is the precise placement of the four separations on top of each other when shooting composite film and lining up printing plates on a press. Improper registration results in blurry, out-of-focus images. Color-separation software should let you create registration marks and labels identifying the different color plates.

Trapping

To see the effects of another technical pitfall, pick up any magazine or newspaper and examine the areas where one color ends and another begins. If trapping wasn't properly accomplished in the original artwork and stripping process (the positioning and assembly of the film components), there will be a white space between the two colors. This occurs because printing presses and paper aren't perfect, resulting in a slight drift in registration.

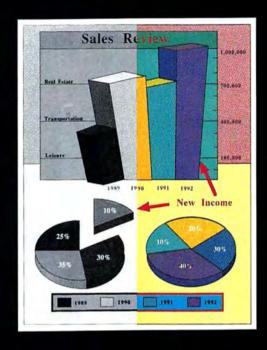
Using traps is a way of compensating for possible misregistration at press time by making the outlines of abutting color objects slightly thicker than usual so that the outlines overlap.

Under-Color Removal

Strictly speaking, only cyan, magenta, and yellow are process colors — when all three are printed on the same area, they produce black by absorbing all the colors reflected from the white surface of the paper. Because of impurities in the ink, however, combining equal amounts of the three colors usually results in a brownish color, so the reproduction doesn't match the contrast of the original. By adding black ink, however, you can add details and contrast that are otherwise impossible to reproduce.

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So see how the other half



COLOR: OUTPUT

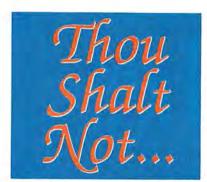


Figure 1: Trapping involves taking measures to prevent a gap between two adjacent colors caused by printing-press misregistration. This exaggerated example shows the results of no trapping and poor registration.



Figure 2: To ensure correct trapping, this image has two overlapping text layers — the bottom layer has a stroke of color created by mixture of the type and background colors. This compensates for the slight drift in registration that occurs during printing.

remove some of the cyan, magenta, and yellow inks from the dark neutral areas of the reproduction to make room for a strong, rich black. This process is called UCR (under-color removal).

This process has other advantages too, such as the ability to bring out better detail and contrast in a photograph. Removing substantial amounts of the process colors from the areas where black is to be printed allows better trapping during press runs, and since process colors are more expensive than black, substituting black for the three process colors makes UCR more economical than true four-color printing — the total deposit of ink on paper is much less. Using black ink also makes it easier to balance the other three colors, especially in shadowed areas.

Gray-Component Replacement

In recent years, the idea of UCR has been extended to apply to any image area in which all four colors are printing (which usually includes most of the image in a continuous-tone photograph, where there is an immense variety of colors). Again, the amounts of cyan, magenta, and yellow are reduced, and the amount of black is increased to compensate. This technique is called GCR (gray-component replacement).

Separation Software

Color-separation programs are abundant: Some are stand-alone products that separate a variety of color images; others incorporate separation capabilities within a page-layout or graphics program. Most separation software provides varying amounts of control over all the variables described.

One of the most comprehensive separation programs is the recently released Aldus PrePrint. PrePrint incorporates built-in color knowledge and works in conjunction with PageMaker Color Extension and other applications that conform to the Aldus-sponsored OPI (Open Prepress Interface) and Adobe color conventions.

PrePrint allows you to improve color and gray-scale TIFF images; make color adjustments to accommodate the press on which the publication will be printed; and produce color separations of TIFF files or the entire document, including text, illustrations, and images.

PrePrint is specifically designed for production rather than design. It uses either predefined values or a range of

choices that, according to Aldus, have "real world" antecedents. (Aldus spent many months in color trade shops around the world researching how color separations are made.) In Pre-Print, certain functions, such as normalizing tones and gray-balancing an image, are used quite extensively but almost always within a fairly narrow spectrum of possibilities. PrePrint lets you fix many problems. such as dot gain, by clicking on a single button.

Coming Attractions

Color output is a combination of art, science, and technical skill. Professionals who work with color often spend years in training, and it's their judgment



Figure 3: A moiré pattern in a final printed image is the result of incorrectly adjusted screen angles. In this image, the magenta screen angle was deliberately misset to 85 degrees, instead of the usual 75 degrees.

and skill that we have relied on for so long to produce quality color printing. The potential cost savings of bringing some of these skills to the desktop are enormous —as much as two-thirds of your prepress bill — but so too are the responsibilities.

Color from the desktop is here, and on the technical side, it's only going to get better and easier. The art, however, will always be part of the process. There will always be a need in color publishing for creative, skilled professionals.

Robert Virkus is president of MicroMedia, an electronic-publishing-consulting firm based in Montclair, New Jersey. Kudos to Steve McKinstry, president of Digital Publishing Integration in San Francisco, California, for his advice on color separation.



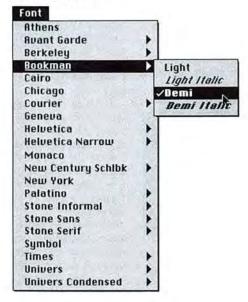
Figure 4: Aldus PrePrint allows you to adjust for dot gain and gray-component replacement in the Print dialog box. Other menu selections enable you to enhance a color image's contrast, highlights, and color cast with one-step commands.

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Before Adobe Type Reunion

Font 1Stone Serif 2Stone Sans 3Stone Informal Athens **Avant Garde** B 1Stone Serif Bold **B 2Stone Sans Bold B** 3Stone Informal Bold B Avant Garde Demi ✓B Bookman Demi **B** Courier Bold B Helvetica Bold B New Century Schibk Bold **B** Palatino Bold **B Times Bold** B Univers 65 Bold Berkeley Berkeley Black Berkeley Black Italic **Berkeley Bold** Berkeley Bolditalic Berkeley Book Berkeley Book Italic Berkeley Italic BI 1Stone Serif BoldItalic BI 2Stone Sans BoldItalic BI 3Stone Informal BoldItalic Bl Avant Garde DemiOblique BI Bookman Demiltalic BI Courier BoldOblique BI Helvetica BoldOblique BI New Century Schibk Boldit BI Palatino BoldItalic **BI Times BoldItalic** Blk Univers 75 Blk0 Univers 75 BlackOblique **BO Univers 65 BoldOblique** Bookman C Univers 57 Condensed Cairo CB Univers 67 CondensedBold CBO Univers 67 CondBoldObl Chicago CL Univers 47 CondensedLight CLO Univers 47 CondLightObl CO Univers 57 CondOblique Courier Geneva Helvetica

After Adobe Type Reunion



While scrolling through our incredibly long font menu one day, we noticed the italics were hiding in the I's and the bolds were huddled in the B's. Usually-but not always. There had to be a better way.

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So if your font families are scattered all over, isn't it time you reunite them? To find

out where you can buy Adobe Type Reunion, just call 1-800-344-8335. Outside the U.S.A. and Canada, call your local distributor.





COLOR: DUTPUT

Output Obstacles

The final step in producing film is using an imagesetter, which is similar to an extremely high-resolution laser printer that can output an image on either film or photosensitive paper.

The most commonly used imagesetter is the Linotronic L300, which was in the first generation of these machines that could be connected to a PostScript RIP (raster-image processor). A Post-Script RIP converts the type and image information into a pixel-by-pixel rendition in the requested size and resolution for the particular imagesetter it's connected to. Other manufacturers have caught up with Linotronic and now offer their own PostScript-compatible imagesetters, such as the Agfa/Compugraphic 9400 and the Varityper 4300.

Several smaller companies have also introduced imagesetters, such as the Ultra*Setter from Hell Graphics and the ColorSetter 2000 from Optronix. The price has come down enough on these machines — from more than \$250,000 a few years ago to \$50,000 or less today — that some publishers that generate a lot of film work are contemplating installing one in-house.

But there's more to printing than just buying the hardware. Operating an imagesetter in-house isn't a minor undertaking. Beyond the cost of purchasing the machine are operating and maintenance costs. You also need one or two trained operators, and to prepare for emergencies, you need some kind of backup — either a second machine or a local prepress house that is willing to rent its equipment to you.

Imagesetters are relatively delicate machines that need calibrating at least once a day. In addition, film densities must be checked, and the processing chemicals, film, and laser need to be routinely adjusted (see "Getting It on Film" in this issue's DTP section).

Output personnel require extensive training, and they must be constantly vigilant — a couple of the disadvantages of bringing

imagesetters in-house. Also, the relatively lower-cost imagesetters are being asked to perform functions that machines costing tens of thousands of dollars have typically done, which can cause problems.

A major difficulty is producing good-quality output consistently. Most low-cost imagesetters are based on machines that were originally designed for typesetting. Positioning four sheets of film to register dot-for-dot is a tough assignment for them. Imagesetters also experience occasional problems with banding at certain screen angles, poor registration because of varying film feed during exposure, and inconsistent dot formation. Manufacturers are addressing these problems, and current indications are that these technical problems will be solved. But with so many variables in the process, any of which can cause problems, outputting film is a job that is usually better left to the professionals at a preprint shop.

In-house or at a prepress bureau, outputting a halftone is a time-consuming business. When you multiply that by four to get separations, it's evident that outputting film efficiently without running up huge bills isn't easy — four pieces of film can take two hours or more to produce, which can mean the loss of any cost savings from doing prepress work on your Mac.

The PostScript professional imagesetters that high-end prepress service bureaus use contain special RIPs that accept gray-valued pixels and generate halftone dots at the correct size and shape to create film images. These RIPS have been optimized for speed, and since they've been around for at least 20 years, they can create algorithms that construct dots that print well.

Desktop-color-prepress vendors have looked to PostScript by default to do the halftoning for them, but unfortunately, Adobe's halftoning algorithm is primitive by color-industry standards. Adobe is aware of this problem and is expected to release a more comprehensive Color PostScript sometime this year.

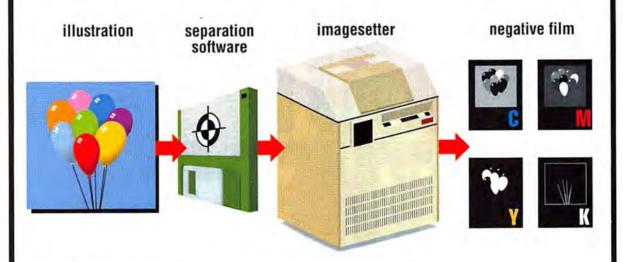


Figure 6: After this color image is separated with a color-separation program, it is sent to an imagesetter, which outputs four negatives. These are used to expose the printing plates, and then cyan, magenta, yellow, and black inks are applied to their respective plates on the printing press. Adobe Type Manager is a trademark and PostScript* is a registered trademark of Adobe Systems Incorporated.



Introducing the Kodak Diconix M150 plus printer. Don't take a Mac anywhere without one. Now you can print out a sudden revision, a quick letter, an instant overhead anywhere!

Just think of all the things you can do if you have a printer with your Macintosh computer. Those last-minute improvements on the presentation. And the letters and reports that could be on their way right now. Then there's the sheer convenience of being able to read what you write before

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It's all easy if you have the new Kodak Diconix M150 plus printer. It's easy to carry (3.1 lbs.), prints PostScript*-quality outline fonts using Adobe Type Manager[™] software, as well as presentation graphics. And it works as well on the desktop as it does on the road. No printer in the world is quieter, smaller or lighter.

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Color Product Directory

This list includes only products used in the process of creating printed color images on the desktop.

Color Calibrators and WYSIWYG Color

Radius

1710 Fortune Drive San Jose, CA 95131 (408) 434-1010 PrecisionColor Calibrator, \$695

RasterOps .

2500 Walsh Ave. Santa Clara, CA 95051 (408) 562-4200 Barco Calibrator, \$12,500 (includes monitor and board)

Tektronix, Inc.

P.O. Box 1000 M/S 63-583 Wilsonville, OR 97070 (800) 835-6100 TekColor, \$50

Color-Separation Software

Adobe Systems, Inc.

1585 Charleston Road P.O. Box 7900 Mountain View, CA 94039 (800) 344-8335 (415) 961-4400 Adobe Photoshop, \$895 Adobe Illustrator 88 1.9.3,\$495

Aldus Corp.

411 First Ave. S. Seattle, WA 98104 (206) 622-5500 Aldus PrePrint, \$495 FreeHand 2.02, \$495

Avalon Development Group

1000 Massachusetts Drive Cambridge, MA 02138 (617) 661-1405 PhotoMac, \$795

Claris Corp.

5201 Patrick Henry Drive Santa Clara, CA 95052 (408) 727-8227 MacDraw II 1.1,\$399

Computer Friends

14250 N.W. Science Park Drive Portland, OR 97229 (800) 547-3303 Modern Artist 2.0,\$395 Deneba Software

3305 N.W. 74th Ave. Miami, FL 33122 (305) 594-6965

Canvas 2.1 (with Separator), \$299.95

LaserWare

P.O. Box 668 San Rafael, CA 94915 (415) 453-9500 LaserPaint Color II, \$595

Letraset USA

40 Eisenhower Drive Paramus, NJ 07653 (201) 845-6100 ColarStudio, \$1,995 DesignStudio, \$795

Migrant Software

313 Iona St. Naberth, PA 19072 (215) 667-9781 RagTime, \$599

Multi-Ad Services

1720 W. Detweiller Drive Peoria, IL 61615 (309) 692-1530 Multi-Ad Creator, \$995

Pre-Press Technologies, Inc.

2443 Impala Drive Carlsbad, CA 92008 (619) 931-2695 SpectreSepsPM (for PageMaker), \$295 SpectreSepsQX (for QuarkXPress), \$295

Quark

300 S. Jackson, Suite 100 Denver, CO 80209 (303) 934-2211 QuarkXPress, \$795

SuperMac Technology 485 Potrero Ave.

Sunnyvale, CA 94086 (408) 245-2202 PixelPaint 2 (includes PixelScan for JX-450 and Scanmaster), \$395 PixelPaint Professional (includes Pixel-Scan for JX-450 and Scanmaster), \$699 Color-Slide Makers

Agfa Matrix

One Ramland Road Orangeburg, NY 10962 (914) 365-0190 Forte, \$36,995; with bulk loader, \$44,995 Pracolor, \$5,995 Slidewriter, \$12,995

American Liquid Light

2341 W. 205th St. Torrance, CA 90501 (800) 828-9877 (213) 618-0274 Still Light, \$3,995 Vérité, \$5,995

Lasergraphics

20 Ada Irvine, CA 92718 (714) 727-2651 LFR, \$8,750 LFR Plus, \$13,750

1401 E. 79th St.

Management Graphics

Minneapolis, MN 55425 (612) 854-1220 *Solitaire*, 4-line resolution, \$27,000; 8-line resolution, \$35,000; 16-line resolution, \$75,000

Mirus Corp.

4301 Great America Parkway, Suite 300 Santa Clara, CA 95054 (408) 980-9770 Mirus FilmPrinter, \$6,390

Pansophic Systems

2400 Cabot Drive Lisle, IL 60532 (800) 323-7335 Masterpiece Film Recorder, Model 8770,

\$50,000 Masterpiece Film Recorder, Model 8780,

Masterpiece Film Recorder, Model 87 \$70,000

Polaroid Corp.

575 Technology Square Cambridge, MA 02139 (800) 225-1618

Bravo Computer Slide Maker, \$6,000

Presentation Technologies 743 N. Pastoria Sunnyvale, CA 94086 (408) 749-1959

Montage FR1, \$6,995

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Color Product Directory, continued

Memory Management

Aladdin Systems

Deer Park Center, Suite 23A-171 Aptos, CA 95003 (408) 685-9175 Stuttil Classic, \$25 Stuttil Deluxe, \$99.95

Connectix Corp.

125 Constitution Drive Menlo Park, CA 94025 (415) 324-0727 Virtual, \$199; with PMMU, \$545

Electronics for Imaging

950 Elm Ave. San Bruno, CA 94066 (415) 742-3400 ECOMP, for internal use.

ECOMP, for internal use, \$1,000; one-time licensing fee for developing applications,

\$10,000

Salient

3101 Avaion Court Palo Alto, CA 94306 (415) 852-9567 DiskDoubler, \$59.95

Scanners

Array Technologies, Inc.

7730 Pardee Lane Oakland, CA 94621 (415) 633-3000 **AS-1Mac**, \$28,400

Barneyscan Corp.

1125 Atlantic Ave. Alameda, CA 94501 (415) 521-3388 Barneyscan Slide Scanner, \$9,495

Eikonix

32 Wiggins Ave.

Bedford, MA 01730 (617) 276-7195 Elkonix 1412 Slide Scanner, \$20,500 Elkonix 1435 Slide Scanner, \$9,900

Howtek, Inc.

21 Park Ave. Hudson, NH 03051 (603) 882-5200 Scanmaster, \$6,995 Scanmaster II, \$4,995 Scanmaster 35, \$6,995 Scanmaster 35 II, \$6,995

Imapro Corp.

2 Crosfield Ave., Suite 208 West Nyack, NY 10994 (914) 353-4701 QCS-450i, \$11,490 QCS-120, \$13,790 QCS-35, \$12,990

Knowledge Software, Inc.

P.O. Box 728 Ossining, NY 10562 (914) 762-7667 Nikon LS-3500 with PhotoMagic software, \$15,000

Microtek Lab, Inc.

680 Knox St. Torrance, CA 90502 (213) 321-2121 Microtek MSF-300Z, \$2,695

Mitsubishi International Corp.

701 Westchester Ave. White Plains, NY 10604 (914) 997-4999 \$C-7500, \$8,950

Nikon, Inc.

Electronic Imaging Dept. 623 Stewart Ave. Garden City, NY 11530 (516) 222-0200 Nikon LS-3500, \$9,995

Sharp Electronics Corp.

Mahwah, NJ 07430 (201) 529-8200 JX-100 Personal Color Scanner, \$995 JX-300 Personal Color Scanner, \$3,995 JX-450 Professional Color Scanner, \$6,995 JX-600 Commercial Color Scanner, \$14,995

Truvel Corp.

Sharp Plaza

8943 Fullbright Ave. Chatsworth, CA 91311 (818) 407-1031 Truvel TZ-3BWC, \$11,590 Truvel TZ-3BWCT, \$13,590

Scanning Software

Adobe Systems, Inc.
1585 Charleston Road
P.O. Box 7900
Mountain View, CA 94039
(800) 344-8335
(415) 961-4400
Adobe Streamline (works with any scanner that

can produce TIFF files), \$395

Imagenesis

901 N.E. Loop 410, Suite 630 San Antonio, TX 78209 (512) 824-1746 *ChromaScan* (works with JX-300, JX-450, Scanmaster I, and Scanmaster II), \$195

LaserWare

P.O. Box 668
San Rafael, CA 94915
(415) 453-9500
LaserPaint Cotar II (works with JX-300, JX-450, Scanmaster, Scanmaster II, Scanmaster 35, and Scanmaster 35 II), S595

Mitsubishi International Corp.

701 Westchester White Plains, NY 10604 (914) 997-4999 SC-7500 Utility (works with SC-7500), \$300

Nikon, Inc.

Electronic Imaging Dept. 623 Stewart Ave. Garden City, NY 11530 (516) 222-0200 ColorFlex (works with Nikon LS-3500), \$750

Prism Enterprises

14703-E Baltimore Ave., Suite 248 Laurel, MD 20707 (301) 604-6611 *MacScan* (works with JX-300 and JX-450), S99

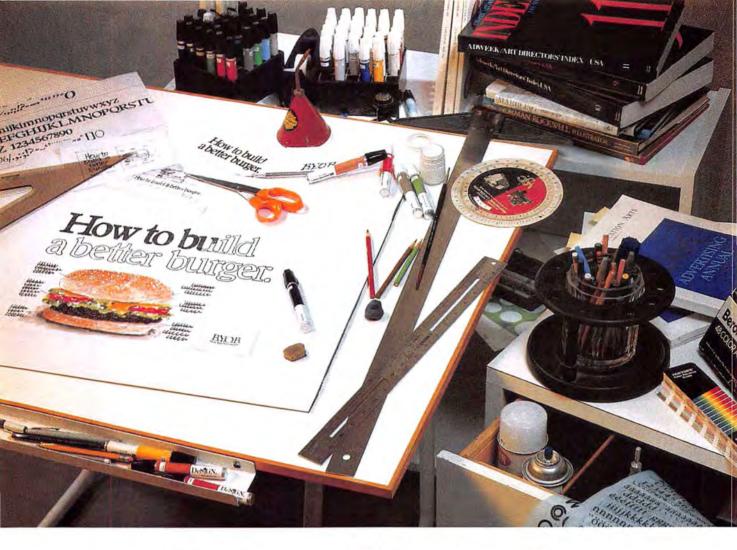
Sharp Electronics

Sharp Plaza Mahwah, NJ 07430 (201) 529-9500 Studio/B Scanner Installer (works with JX-300 and JX-450), free to owners of Studio/8

Studiotronics, Inc.

1031 S. Semoran Blvd, Winter Park, FL 32792 (407) 657-0677 Colorset (turns gray-scale scanners into color scanners; works with Abaton 300GS, Apple Scanner, Datacopy 730GS and 830GS, and HP ScanJet Plus), \$399.95

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You know what it's like. If you're in graphic arts, you know there's a lot of grunt-work.

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Trying to get true colors from a junkyard of dried-out markers.

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T-squaring elements to be sure they're aligned and square.

Counting characters.
Spinning proportion wheels.
Tracing off the Lucy.

Wouldn't it be nice to spend more time exercising your brain instead of

your wrist? Exploring concepts? Refining layouts? Trying "What if" design options? Or experimenting with color combinations?

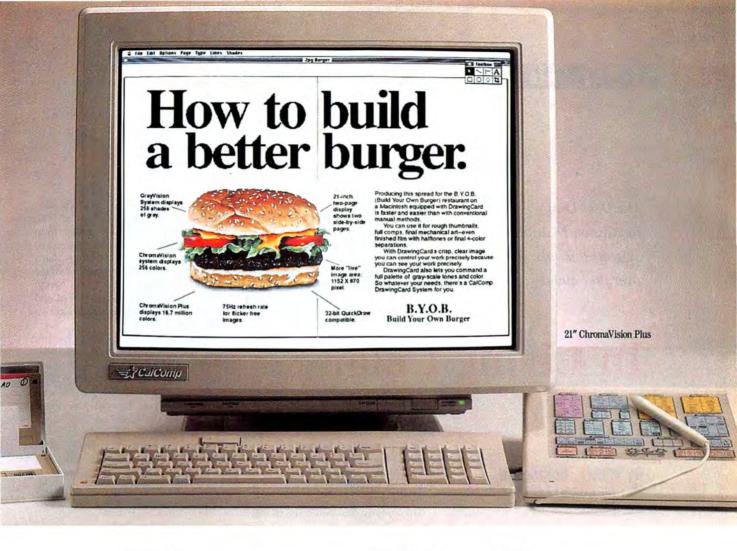
That's exactly what you can do using today's advanced layout, design, and illustration programs, the Macintosh II™ family of computers and a CalComp DrawingCard™ display system.

CalComp large screen displays help you get the most from your Macintosh. For one thing, they never let you lose sight of the big picture. DrawingCard is the first 21" system to give you two full pages of color side-by-side at actual size. That's critical when you're

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DrawingCard's flat screen eliminates distortion and with its excellent resolution and contrast you can see the effect of small changes in the colors right on the screen. Or evaluate the visual effect of half-point variations in type size and leading. You can even see the precise amount of letter overlap when you set your headlines "tight and touching."

And with DrawingCard displays, what you see on the screen is what you get on your printer because screen resolution is true 72 dpi.



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Our 8-bit ChromaVision system with 256 colors is the perfect match for the great majority of desktop pub-

21" GrayVision

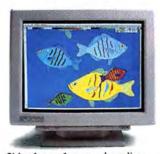


lishing, design and illustration projects where 4-color reproduction is needed.

And our 24-bit ChromaVision Plus system (shown above) with 16.7 million colors is the ultimate display where color accuracy is especially critical such as color retouching.

DrawingCard display systems are just one way CalComp, a worldwide

21" ChromaVision



DrawingCard monitors feature 75Hz refresh rate for flicker-free performance, large live area (1152x870 pixels) and 72dpi screen resolution for true WYSIWYG.

graphics leader, supports the arts on Macintosh. There's also WIZ,™ a new mouse system that combines the features of a traditional mouse with the power of a graphics pad. Plus a complete line of high-performance printers.

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MacUser Labs focuses on 18 display systems that take you over the rainbow.

seem superfluous, considering that a simple seven suffices for rainbows. This sevenway split of the spectrum arises solely from nomenclature, however — we name only seven colors in the rainbow even though a near infinity of hues fits neatly in the range from red to orange alone.

ixteen million colors may

In Living Color

By Winn L. Rosch and the MacUser Labs staff All those intermediary hues constitute the difference between reality and its representation on the computer screen — unless you endow your Mac II with a color display system. Equipped for either 8- or 24-bit color, the Mac can use a palette of 16.8 million colors — wider than even Rembrandt or Renoir could have imagined.

The color-display market has changed

dramatically since we last reviewed color systems (see "True Colors," October '88). Color has blossomed on the desktop, from image retouching and color prepress to animation and CAD. Scanners have soared, and printers have proliferated (see "Color on the Page," in this issue). On the display side, quality has improved and 24-bit color has gone from a novelty to a mainstream option.

To assess the state of display art, MacUser Labs put 18 Mac II color display systems through their paces. Each system consisted of a monitor (ranging in size from 13 to 21 inches) coupled with an 8-bit video card from the same manufacturer. We also tested one 24-bit system, the RasterOps Calibrator (at press time, an 8-bit version had just been released). Eleven of the monitors can also be purchased with 24-bit NuBus cards (see Table 1), and seven of the 8-bit setups are available with SE/30 cards (PCPC's cards are 16 bits).





Most companies sell monitors and cards separately as well as bundled together (see the "Mix and Match" sidebar). For instance, the 14-inch Magnavox monitor that comes with the MacProducts Magic View system can also be purchased separately, for \$695, and works with Apple's 8-bit video card. Be forewarned, however, that coupling disparate monitors and cards may not provide you with the superior focus, color accuracy, and other qualities that you get in a prepackaged Mac display system.

How much will you pay for a color display system? That depends on what you want — how many hues and how many inches. Certainly, it's a bigger investment than a monochrome or grayscale setup. (For more on these systems, see "A Study in Black and White," April '90, and "Grading the Grays," October '89.) The best retail price we've found is an amazing \$895 for the MacProducts Magic View. Apple's 13-inch High-

Resolution RGB system is a hefty \$1,647. A bigger screen takes a much bigger bite from your budget. The least expensive, Generation X's CT-II, costs \$3,999 and gives you a 20-inch Ikegami-Sony Trinitron monitor coupled to an 8-bit video board. At the upper end, the RasterOps Calibrator sets you back \$12,500 - but you also get an ultra-high-end system with 24-bit color; an internal microprocessor that controls all aspects of monitor performance; and the Optisense calibrator, an external sensor that helps control color accuracy. In general, expect an SE/ 30 system to cost about the same as an 8bit Mac II setup, and plan to pay a few thousand dollars more for a full 24 bits of color.

Color by Number

The big question is whether you need direct color — 24 bits (or the 16 bits PCPC offers on its SE/30 video cards) — or if you can get by with 8-bit color.

There's no question about it: Images displayed in 24 bits have smoother shadings and a broader range of hues than do 8-bit images. (You must have 32-bit QuickDraw installed to use more than 8 bits of color, and you need a Mac II to handle 24-bit color.) The principal difference between 8- and 24-bit color is how the color information is stored (see the "How It Works" sidebar). Either kind of system can select from a palette of millions of colors, but an 8-bit setup can put only 256 different colors onto your screen at one time. In contrast, a 24-bit system can display any of its 16.8 million hues anywhere, anytime.

Direct-color systems can display all the color possibilities, with no banding or dithering, but you pay for that capability in memory, speed, and price. Storing millions of color values requires a lot of memory—24-bit color needs three times as much video RAM as does 8-bit. This added memory requirement is the reason



24-bit boards cost more.

Screen redraws can be interminable in 24-bit mode, because all the extra data makes the Mac's microprocessor work much harder to display images on-screen. Thankfully, 32-bit QuickDraw has been streamlined to cut some of that speed penalty, but you can still expect screen changes with 24-bit color to take two to three times longer than in 8-bit mode. To help put the zip back into screen updates, you might consider a graphics accelerator (see the "QuickDraw Accelerators" sidebar). A graphics accelerator can make 24-bit performance faster than that of unaccelerated 8-bit operations. SuperMac

considers accelerators so necessary for acceptable 24-bit performance that it bundles the accelerator-equipped Spectrum/24 Series III card with its 24-bit systems.

Sticking with 8-bit color really isn't a hardship, however. No image ever contains 16 million different hues — and after all, there are usually fewer than a million pixels on a Mac screen. Scanned photographs usually have a palette of only 2,000 to 4,000 distinct colors and can be displayed reasonably well with just 256 colors. Nevertheless, 8-bit images are less realistic than are 24-bit images. Typically, they have the overall

cast of a single color because of the restricted on-screen palette. Eight-bit images also tend to be grainy, because the color differences of adjacent pixels are less subtle than they are with 24 bits.

Pixels and Dots

After you've settled the color issue, turn your attention to screen size, resolution, tube type, and dot pitch. These variables influence a monitor's sharpness and color quality and often mean the difference between a top-notch display and one that gives you migraines.

Among the monitors we tested, the diagonal tube size varied from 13 inches

Mix and Match

When quality counts, the best choice for a Mac color display is a matched monitor and video board. Sometimes, however, you need more flexibility. You might have several different computer systems — Macs, Apple IIs, PCs — and you'd like to standardize on one monitor. Or perhaps you need to plug the monitor into an NTSC source such as a multimedia card or VCR, which have lower scan rates than Mac displays. Then again, maybe you just want a monitor that's 20 to 30 percent cheaper than the typical Mac-only display.

In each of these cases, the solution is a multiscan, or multisync, monitor. Unlike the fixed-frequency displays common in the Mac world, multiscan monitors can handle a wide range of horizontal and vertical scanning frequencies. Multiscans are popular on the PC side because those computers are plagued by several different monitor and video-card standards.

All multiscan monitors are not created equal, however, and you must shop carefully to ensure that the one you buy meets your needs. Most importantly, multiscans differ in the frequencies and types of signals they can accommodate. If the horizontal and vertical frequency range of your multiscan monitor doesn't encompass the frequency generated by your video board, you'll wind up with a rolling

screen image akin to that of a '50s television on the fritz. (See Table 1 for the scan rates of the video boards we reviewed.) Multiscans also differ in their input capabilities. The possibilities include digital (Apple II and early PCs), analog (Mac II and IBM-compatible VGA systems), and composite (NTSC sources). Finally, the display systems use several different color standards; if you need to accommodate all the variations, be sure to get a multiscan monitor with a color-mode switch.

One nifty feature often overlooked in choosing a multiscan monitor is the ability to automatically size the image so that it properly fills the screen. Autosizing compensates for the variations in

video standards and ensures that the display fills the screen without overflowing the edges. If a multiscan monitor has readily accessible size and position controls, you can compensate for size discrepancies manually — provided you don't mind readjusting the display every time you switch computers or operating modes.

In case your appetite is now sufficiently whetted, here are a few of our multiscanning favorites. If all you need is an inexpensive display that matches the Mac II standard of 640 x 480 pixels, check out the Magnavox Mac Color Display (\$695). This monitor is part of the MacProducts Magic View system we reviewed; contact Magnavox for the location of your nearest dealer. Magnavox, 1 Philips Drive, Knoxville, TN 37914; (615) 521-4316.

For a bit more money, you can get what we feel is the best small color monitor for the Mac: the Sony CPD-1304. This 14-inch Trinitron tube is on the pricey side at \$1,095, but it's money well spent. Sony Corp., Computer Peripheral Products, 1 Sony Drive, Park Ridge, NJ 07656; (201) 930-1000.

Need NTSC composite video? Try the Mitsubishi AUM-1381ATS DiamondScan or the Sony GVM-2000. Both feature NTSC; Mac II; and IBM CGA, EGA, and VGA video compatibility. The DiamondScan

(\$889) has a 14-inch shadow-mask tube, and the Sony GVM-2000 (\$2,300) features a 20-inch Trinitron tube. Mitsubishi, 991 Knox St., Torrance, CA 90502; (213) 515-3993.

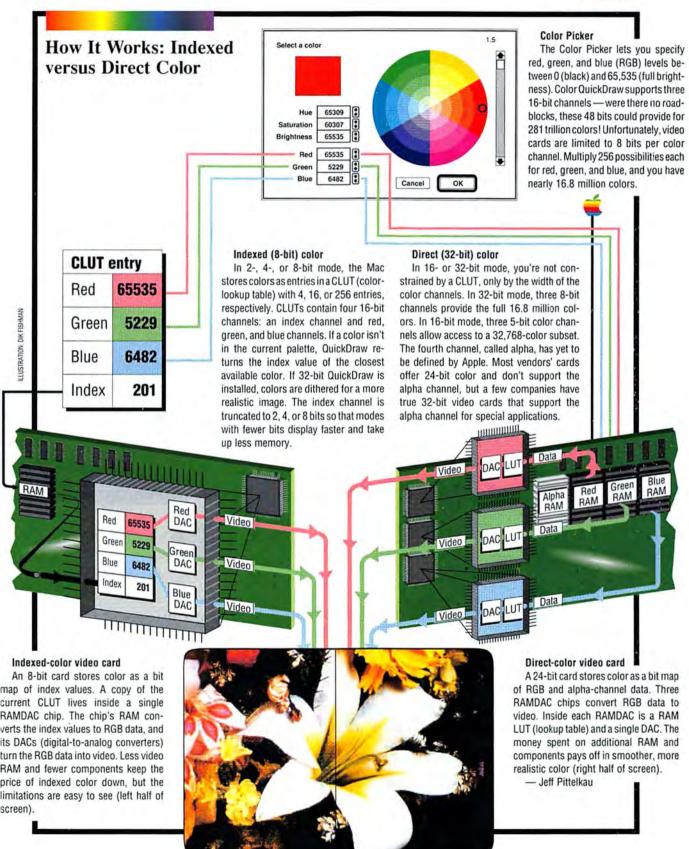
If you want an inexpensive 8-bit video card for any of the monitors mentioned above, check out the Micron Xceed NB6-48 video card (\$595). Bundled with the card are a DA called Gamma, which can set brightness, contrast, and gamma of the RGB video signals; and MacroPaint, which is a basic color paint package. Micron Technology, Inc., 2805 E. Columbia Road, Boise, ID 83706; (800) 642-7661 or (208) 386-3800.

- Winn L. Rosch and Jeff Pittelkau



The Mitsubishi AUM-1381ATS DiamondScan (left) and Sony CPD-1304





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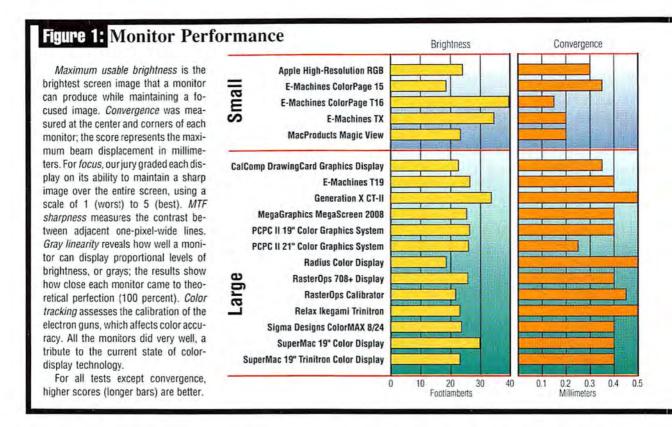
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(Apple) to 21 inches (CalComp, PCPC). A large monitor obviously can show you more - more rows of a spreadsheet, an entire drawing, even two 8.5-x-11-inch pages side by side. Smaller monitors are considerably less expensive, however, and often have sharper displays, which you may prefer for word processing or detail work.

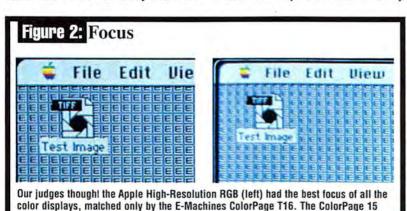
Exactly how much information a monitor can display also depends on its resolution, which is variously measured

(right) was in the sharpness basement.

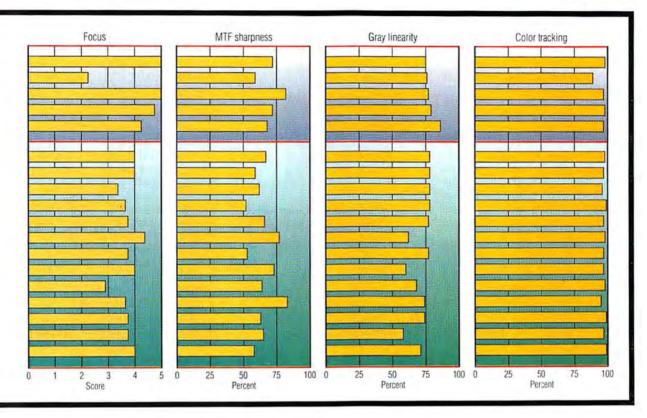
in pixel dimensions and dpi (dots per inch). Pixel dimensions are the height and width of the active screen as measured in pixels (picture elements, or dots); the dpi figure indicates how closely these pixels are packed together. We'll refer to resolution in terms of dpi because that's what determines the pixel dimensions, which in turn tell you how much data you can see on-screen at one time.

Most of the monitors have screen resolutions of 72 dpi, the standard set by Apple for a one-to-one (WYSIWYG) match with what appears on paper. A higher dpi yields images that are smaller on-screen than they are on paper; a lower dpi magnifies the display. Higher resolutions can make the screen appear sharper, although text may be almost too small to read; a lower resolution lets you work farther from the screen and is good for presentations.

Similarly sized monitors with varying resolutions show vastly different amounts of information. For example, of E-Machines' two 16-inch models, the TX displays nearly 40 percent more information than does the ColorPage T16. The difference is resolution - the TX has an 87-dpi display, which shows 827,392 pixels on-screen, more than any of the other small monitors. The ColorPage T16, with its Apple-standard 72 dpi, can't keep up. Two of the large monitors can display more than a million pixels. With a resolution of 82 dpi, the Radius Color Display can show 1,016,064 pixels; that's 25 percent more screen area than that of the other 19-inch monitors and also more information than the 21-inch models can handle. The Cal-Comp DrawingCard comes close, with







just over a million pixels; PCPC's 21inch model displays only as much data as most 19-inch monitors do.

Resolution is controlled by the video card, but another determinant of screen sharpness, dot pitch, depends on the technology used in the CRT (cathode-ray tube). All color CRTs use three electron beams (red, green, and blue) to produce images. In conventional displays, three electron guns are arranged in a triangle and aimed at phosphor dots painted on the screen. The phosphors are grouped into triads of red, green, and blue dots, and each electron beam strikes dots of the same color. To help aim the beams and prevent them from bleeding into adjacent dots, conventional CRTs - such as those in the Magic View and Calibrator - use a shadow mask, a thin sheet of metal riddled with holes. The spacing of these holes is the tube's dot pitch, and it sets the lower limit for sharpness.

Stray beams can overheat shadow masks and deform them, so vendors such as CalComp, PCPC, and SuperMac now use masks made from INVAR, a heatresistant alloy that doesn't deform. This heat resistance lets manufacturers use higher beam currents, which produces a Figure 3: Superior Software RasterOps Calibrator 1.0 M Degauss 100 100 Geometry... Settings Color Temp: 5300 K Load Daylight value: D53 Preset 1 Saue Color Calibration... Preset 2 Store as Calibrated About Calibrator... Preset ...

The RasterOps
Calibrator's DA provides
the ultimate in monitor
control. You can adjust
brightness, contrast,
color temperature, and
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brighter and more uniform picture than traditional shadow-mask designs can.

Despite these improvements, the standard for Mac CRTs remains the Sony Trinitron, used in 12 of the displays reviewed here. Trinitrons have a justly deserved reputation for superior sharpness. Their secret is a single electron gun that produces three identical horizontally aligned beams. The beams are aimed through an aperture grille, which has long vertical slots instead of holes. In addition, the screen phosphors are laid

down in vertical stripes, not dots. This setup provides brighter, better-focused beams limited only by the "slot pitch."

Our tests confirmed that dot pitch is a major factor in screen sharpness. The monitors with the smallest dot pitches — Apple's High-Resolution RGB (.25 mm) and the two 16-inch E-Machines monitors (.26 mm) — were noticeably sharper than the 19-inch Trinitrons (.31 mm dot pitch). There's a good reason that the best-focused monitors are the smaller ones: The farther a beam of electrons

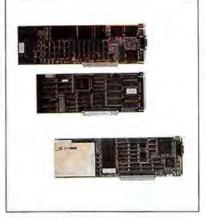
QuickDraw Accelerators

A display with 16.8 million colors doesn't just nick you in the checkbook — it costs dearly in speed as well. The Mac's main processor bears the burden of manipulating 32-bit QuickDraw instructions before sending image data to the video card. The result is an annoying time lag between when you move the mouse and when the shifted object finally drops anchor. To hurry things along, both SuperMac and Radius now offer accelerator cards that improve processing speeds by routing QuickDraw calls away from the Mac's CPU.

SuperMac's Spectrum/24 Series III (\$4,499) is a 24-bit-video card with a built-in 32-bit Color QuickDraw accelerator. This all-in-one solution can be matched with just about any 19-inch color monitor, and it comes standard with SuperMac's 24-bit-color display systems. SuperMac also sells the Graphics Accelerator (\$499), an add-on card that mounts directly onto its Color-Card/24 (\$899).

Rather than piggybacking on the video card, Radius accelerators fit in a NuBus slot alongside a Radius video board. The Radius QuickColor Graphics Accelerator (\$795) employs an Acorn RISC processor that churns through QuickDraw instructions at a healthy 27 megabytes per second. The QuickColor works with any of Radius' DirectColor video boards as well as the Radius GS/C card, so it can be added to the Cclor Display we reviewed.

Radius also markets the QuickCAD Graphics Engine (\$1,495), an accelerator that speeds up display for non-QuickDraw, vector-based CAD software, such as AutoCAD, VersaCAD, and Pegasys. QuickCAD makes these PC immigrants run nimbly on any Mac II that's equipped with a Radius DirectColor or GS/C card. And because QuickCAD is an extended version of the QuickColor Graphics Accelerator, you'll gain



Radius' QuickColor Graphics Accelerator (center) requires a separate NuBus slot from the DirectColor/24 video card (top), while SuperMac's Graphics Accelerator mounts directly on the ColorCard/24 (bottom).

faster processing for QuickDraw-based displays as well.

Both SuperMac and Radius claim that their accelerator cards speed up screen response by 2 to 20 times, depending on the OuickDraw routine. To see for ourselves, we ran benchmarks on a Mac Ilcx with 8 megabytes of memory. First we tested the SuperMac Graphics Accelerator mounted on a ColorCard/24 board, which was attached to Apple's 13-inch High-Resolution RGB monitor. Scrolling was an impressive 7 times as fast, and Fill Rectangles, a routine that repeatedly paints colored rectangles on the screen, displayed 6 times as fast with acceleration.

We then clocked a 19-inch Radius Color Display that contained a DirectColor/24 card assisted by the QuickColor Graphics Accelerator. Scrolling was nearly 2.5 times as fast, and Fill Rectangles was just over 4.5 times as fast.

These numbers show that accelerators can shave fractions of seconds from the Mac's display time, minimizing screen lag and improving the real-time feel of the display. With the QuickColor accelerator, for example, you can scroll in 1 second what formerly took you 2.5 seconds. If you work extensively with 24-bit color, treat yourself to one of these accelerators.

At press time, Apple announced the Macintosh Display Card 8•24 6c, a 24-bit NuBus video card with a built-in QuickDraw accelerator (see "The Mac Ilfx: Fast Times at Apple Computer," in this issue). It supports both gray-scale and color monitors, and Apple claims that the 30-megahertz RISC-based coprocessor will speed up QuickDraw operations by 5 to 30 times. The card should cost around \$2,100 when it goes on sale this summer.

- Kelli Wiseth

travels, the more it spreads. Thus, bigger monitors are harder to focus.

Trinitrons have another advantage; a tube that curves only horizontally. Its vertical flatness reduces the image distortion and glare common to conventional tubes, which are spherical. The latest in CRT technology, the Zenith Flat Tension Mask (FTM), goes one step further, producing a flat screen. Unfortunately, it's hard to maintain focus and geometry on a flat screen. The only monitor that uses an FTM, the ColorPage 15, has a large dot pitch (.3 mm) and the worst focus.

Fine Lines

In order to display a sharp, undistorted image, a monitor must have excellent convergence and geometry. Convergence measures how well aimed the three electron beams are when they converge on a single pixel at the screen. Convergence problems are most noticeable at the screen periphery, because that's where the beams are hardest to control. In a monitor with poor convergence, pixels become a three-color blur. Objects look fuzzy and may be ringed with color.

Convergence problems can severely limit sharpness. The finest detail a Mac can display is the width of one pixel; at 72 dpi, that pixel is .35 mm wide. Convergence errors often reach or exceed this figure, making fine detail impossible to display in the misconverged area of the screen. Misconvergence is most impor-

tant (and the greatest problem) for monitors that have resolutions greater than 80 dpi, because their pixels are so much smaller.

We measured the convergence of each monitor at the center and in all four corners. The resulting score represents the maximum beam displacement we recorded (see Figure 1). The E-Machines ColorPage T16 had the best convergence; its worst displacement was only .15 mm — less than half a pixel. The TX did almost as well; its score of .2 mm is particularly impressive, given its 87-dpi resolution. Our other high-resolution monitor, the Radius Color Display, didn't fare as well. It had the worst score (.5 mm), equaled only by those of the



Generation X and Relax monitors.

We also checked geometric linearity to see how well each display avoided screen distortions such as bowing (outward curving of the image), pincushioning (inward curving), and tilting. All the monitors had good geometry, with the exception of the Magic View, which had shrunken corners that flattened the test circles.

Looking Sharp

As you can see, the apparent sharpness of a color display is influenced by a complex array of factors, including resolution, dot pitch, and convergence. Brightness and glare protection also play a role, as we'll find out shortly. With a poorly focused display, you can't tell the difference between a lowercase *m* and a gnat mashed against the screen. You may even develop eyestrain from squinting at the screen, but no amount of eyeball gymnastics can produce sharpness that's just not there.

To get an objective measure of screen sharpness, we measured the horizontal and vertical MTF (modulation-transfer function) of each monitor, using a customized CCD (charge-coupled device) array and oscilloscope. That is, we compared the contrast of one-pixel-wide black and white lines to that of larger areas of black and white. A monitor with perfect (100 percent) MTF sharpness displays these thin stripes with the same contrast as larger areas. Lower scores indicate fuzziness; in the worst cases, the lines may blur into gray blobs.

The Relax Ikegami Trinitron posted the highest score (83 percent), followed closely by the E-Machines ColorPage T16 (see Figure 1). The MegaGraphics and Radius displays were the fuzziest, with MTF scores in the low 50s. The Radius monitor's high resolution (which means smaller pixels) probably worked against it here, just as it did in the convergence test, although our other high-dpi monitor, the E-Machines TX, had a high MTF score (72 percent).

MTFratings don't always tell the whole story. You may think a display looks focused, no matter what the instruments say. That's because your eyes factor in such things as resolution, convergence, and glare protection. To balance the objective measures, we had a jury of seasoned screen watchers rate each monitor's focus (see Figure 1). The ColorPage T16 again topped the list, along with the

Apple monitor. The Relax monitor dropped dramatically in the standings; its convergence problem made it seem fuzzy. The ColorPage 15 fared the worst (it did only slightly better on the MTF test), demonstrating that the same manufacturer (E-Machines) can produce displays of strikingly different quality (see Figure 2). The RasterOps Calibrator also had a low subjective focus rating — despite being the most sophisticated monitor ever built, it has a shadow-mask tube with a large dot pitch.

Brighter Whites

The absolute intensity of a monitor is important, particularly if you work in brightly lit surroundings in which glare is a problem. However, brighter images may not be as sharp. Increasing the intensity of an electron beam makes it wider, so it may bleed into adjacent pixels. We measured maximum usable brightness, the brightest setting that can be kept in focus (see Figure 1). Under average indoor lighting, most users set their monitors to between 15 and 25 footlamberts. The ColorPage T16 radiated nearly 40 footlamberts, making it more than twice as bright as the two dimmest displays, the ColorPage 15 and Radius Color Display (18.5 footlamberts).

We also determined each monitor's gray linearity, or how well it displays proportional levels of brightness (see Figure 1). Ideally, a monitor should show an area of 50-percent gray at half the intensity of pure white, and likewise for other gray levels. A monitor with poor gray linearity, such as the SuperMac 19" Color Display, doesn't represent different shades of gray accurately, so dark grays may appear black. The Magic View, on the other hand, has the best distribution of gray levels, displaying all the subtle variations in its images.

A monitor with good glare protection lets you reduce brightness and preserve focus. Only the Apple and MacProducts displays lack antiglare treatments, and both suffer from severe glare problems. The best protection is an OCLI (Optical Coating Labs, Inc.) panel, which virtually eliminates glare, although it shows fingerprints with amazing clarity. The E-Machines ColorPage 15 is the only monitor with a true OCLI panel; unfortunately, it's combined with darkened glass, resulting in a dim display that requires you to jack up the brightness so much that it creates severe focus problems.

Most other monitors have similar panels; we found that those with Asahi Glass Anti-Reflective (AR) panels had glare protection equivalent to OCLI's.

Color Coordination

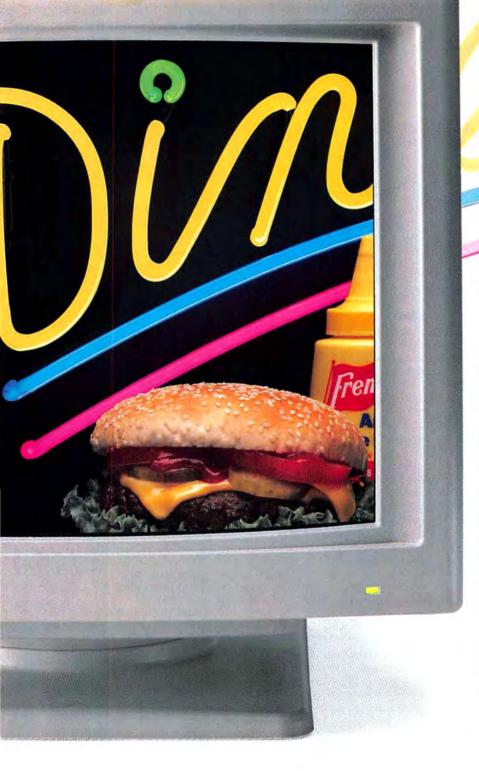
Equipped with an 8- or 24-bit video card, the Mac can display almost any color the eye can see. To be used for serious color work, however, the monitor should display this bounty with the same hues, saturation, and brightness that you see on paper. Color accuracy is affected by several factors, including ambient light, phosphor temperature, and the accuracy of the electron guns. The upshot is that WYSIWYG color from



Small monitors: the E-Machines TX, MacProducts Magic View, Apple High-Resolution RGB, and E-Machines ColorPage 15 (clockwise, from top). Not shown: the E-Machines ColorPage T16, which uses the same Sony Trinitron tube as the TX.



The Radius Color Display uses a Sony Trinitron tube, which has set the standard for Mac monitors with its bright, sharp display and uniform colors. Six other 19inch monitors also use the Trinitron, as do three of the smaller monitors (see Table 1).



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On the Horizon

Any day now, RasterOps should ship two new products that will significantly change the way buyers look at low-end video cards and multimedia video solutions. The ColorBoard 208 (\$495) is an 8-bit-video card that is user-upgradable to 24 bits merely by the addition of a megabyte of video RAM. It uses the same surface-mount technology as does the 24-bit ColorBoard 264 (now priced at \$795), works with several monitors, and is aimed at those who need low-cost 8-bit color now and a simple upgrade path to 24-bit color later. In addition, as video-RAM prices continue to drop, the price of the 24-bit upgrade will drop as well.

RasterOps' other new card, the ColorBoard 364, can display live 24-bit video in a movable, resizable Mac window — even white another application is running. Other features include frame grabbing at a thirtieth of a second; hardware pan, zoom, and virtual-desktop capability; and HyperCard and SuperCard XCMDs. The ColorBoard 364 lists for \$1,995 but for a limited time is \$1,495 — thousands less than competing products. Future add-on products include a Mac-to-NTSC video-converter box and a DA-controlled television-tuner box that receives its instructions via the Mac's ADB port.

- Jeff Pittelkau

screen to paper is almost impossible, although several companies now offer products that attempt some kind of calibration (see the "Color Calibration" and "Tektronix Solution" sidebars in this buyer's guide). One of these firms is Barco, which manufactures the Calibrator monitor.

A monitor's "white" depends on the temperature of its phosphor; the resulting color cast in turn affects the display of every other color. Sony Trinitrons use a cool (9,300 Kelvin) phosphor, which has a bluish tint. Nonetheless, the glow of the screen looks like true white — until you put a sheet of white paper next to it. Do this little exercise, and you'll find that the SuperMac 19" Color Display and Raster-Ops Calibrator are the closest matches to paper white. Both have a low phosphor temperature (6,500 Kelvin and 5,300 Kelvin, respectively), which results in a more yellowish cast.

A more crucial determinant of color quality is the firing accuracy of the electron guns. When producing a gray, for example, the three guns should track perfectly — that is, they should fire with equal intensity. If any of the beams varies even slightly in intensity, the gray will be tinged with color. Poor tracking gives every image an unwanted color cast and destroys any hope of WYSIWYG color.

The simplest way to check color tracking is to measure gray purity, or the absence of color in grays. We assessed the intensity of the red, green, and blue phosphors of each monitor at various levels of gray (see Figure 1); all except the hapless ColorPage 15 passed with flying (lack of) colors. Interestingly, the Calibrator's tracking was no better than any other monitor's, despite its high-powered calibration hardware.

For a subjective assessment of the screens' color accuracy, we displayed a Canvas document containing a color gradient with varying hues and saturation levels. Our jury compared the on-screen appearance of the colors from monitor to monitor, looking for properly saturated colors and good midtones. All the monitors had acceptable color, with the E-Machines T19, Generation X, Mega-Graphics, and PCPC II 21" displays achieving perfect scores. The only monitor with colors that looked truly "off" was — yet again — the Color-Page 15.

Minor Annoyances

There are several additional factors that can make your life in front of a monitor either pleasant or hellish. One of these so-called nuisance factors, glare, has already been discussed. We also checked each monitor for flicker, jitter (image instability), bandwidth problems, screen shrinkage, and noise. All the displays had minimal nuisances, and except for glare, the only irritant worth mentioning is flicker.

Flicker is a slight instability of the screen image. It results when the screen refresh is not fast enough to make individual frames blend seamlessly together. The vertical-scan (or refresh) rate of a display system generally determines how apparent flicker will be. Perception of flicker is very subjective, though; at MacUser Labs, flicker seems more apparent under fluorescent illumination.

Refresh rates above 65 hertz are usually sufficient to eliminate flicker, and our observations bear this out. Only four monitors — the two PCPC displays, the RasterOps Calibrator, and the Relax Ikegami Trinitron — displayed discernible flicker, and all four had a refresh rate of 60 hertz. This flicker was so bothersome that it cost each monitor half a mouse in the overall ratings. By the time you read this, however, both PCPC

and RasterOps should be shipping their systems with higher refresh rates.

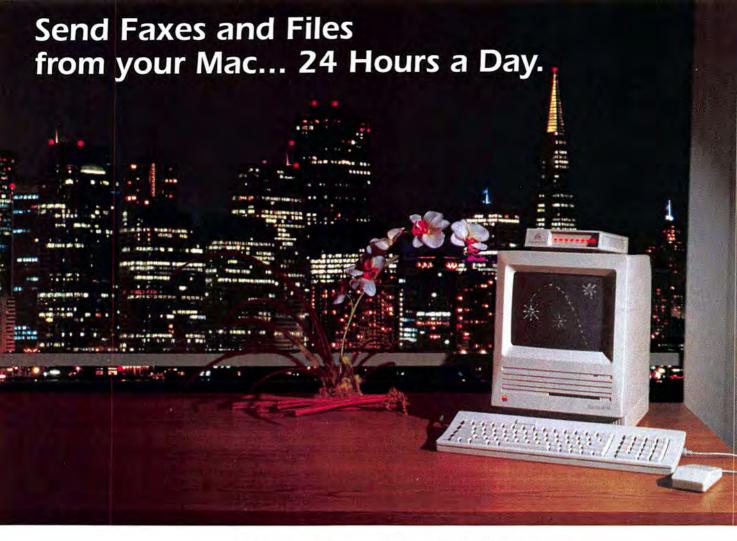
In Control

Setting up a Mac II color display system is easy: Plug in the NuBus card, attach the monitor, and turn it on. A color monitor shouldn't require frequent adjustment, but it should still have controls for tweaking the convergence and for degaussing, which removes the screen distortions caused by nearby magnetic fields (a frailty of color displays).

A few manufacturers give you a modest software bonus (see Table 1). The most common utilities provide brightness and contrast controls, screen savers, screen capture, and big-screen niceties such as an enlarged menu font and cursor, and pop-up or tear-off menus. The Radius cdev provides a well-rounded set of utilities, including the ability to capture color screens with the Command-Shift-3 sequence. The E-Machines displays also



The CalComp DrawingCard Graphics Display (left) and SuperMac 19" Color Display have Hitachi tubes containing a new INVAR shadow mask, which provides brighter, more uniform displays than do traditional shadow masks. Not shown: the PCPC II 21" Color Graphics System.



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The Relax Ikegami Trinitron (shown) and Generation X CT-II use Sony Trinitron tubes coupled with electronics from Ikegami.



The RasterOps Calibrator is the most sophisticated monitor ever built. This ultra-high-end system offers 24-bit color; an internal microprocessor that controls all aspects of monitor performance (including color drift); and the Optisense calibrator, an external sensor that helps control color accuracy.

include some handy utilities.

The RasterOps Calibrator offers the ultimate in monitor control (see Figure 3). Its DA lets you set brightness, contrast, color temperature, and screen geometry. The geometry controls are very useful because you can hand-tweak your monitor to perfection, eliminating bowing or pincushioning. The DA also lets you store different preferred brightness, contrast, and color-temperature settings for two users.

The RasterOps and SuperMac display systems have board-based pan and zoom options plus a virtual desktop that lets you work with screen sizes greater than

the normal 1,024 x 768 pixels. Essentially, you trade color for screen size: The more video memory you devote to the virtual screen, the fewer color-bit levels are available. In 24-bit mode, the Raster-Ops monitors support an extended desktop of 1,024 x 1,024 pixels—only slightly larger than normal. In 4-bit mode, the horizontal screen width grows to 2,048 pixels, or 2.4 feet. At 2 bits, it's a whopping 4.7 feet. The SuperMac monitors offer even more desktop per bit; in 8-bit mode, the Mac II displays support virtual screens of 4.7 x 1.8 feet. SuperMac plans to add additional firmware features, such as a lockable menu bar, in the near future. The PCPC displays are bundled with Stepping Out II, a virtual-screen utility that can also magnify images up to 16 times. Because Stepping Out II uses the Mac's RAM, however, virtual-screen scrolling isn't as swift or smooth as using the board-based method.

Software and other goodies are nice pluses, but they can't redeem a fuzzy image or poor color quality. Our recommendations (see "The Bottom Line") can help you find your own pot of gold at the end of the 16.8-million-color rainbow.

Winn L. Rosch is an attorney who often writes about computer-related topics.

The Bottom Line

The winner and still champion among 8-bit color display systems is the **E-Machines ColorPage T16** (\$3,595). We simply couldn't find a flaw in this razor-sharp 16-inch Trinitron. It scored near the top in every test and has excellent glare protection and software to boot. Its



companion model, the TX (\$4,495), uses the same excellent monitor matched with a higher-resolution video card. The result is an incredibly sharp 87-dpi display that's just right for CAD and freehand drawing (but less desirable for WYSIWYG desktop publishing). Overall, the 16-inch Trinitrons appear to optimize the technology without succumbing to the focus

problems of larger displays. If this size and quality appeal to you, keep an eye out for similar 16-inch models from MegaGraphics, RasterOps, and PCPC.

For those who prefer a smaller monitor, the Apple High-Resolu-

tion RGB display (\$1,647) remains our favorite. It was the first Mac color display to hit the market, but it still sets the standard for focus and color quality. Its only drawback is a lack of adequate glare protection. If you just want a rock-bottom color display, consider the MacProducts Magic View. It's not as sharp as the Apple, and it



didn't receive the best test scores, but hey — it's only \$895!

Among the big screens, we recommend the RasterOps 708+ Display (\$5,790) and the SuperMac 19" Trinitron Color Display (\$5,799). These 19-inch Trinitrons scored well across the board; add to that hardware pan, zoom, and virtual-desktop capability, and you have two products that go one step beyond. If you



can't afford a Trinitron, buy the **SuperMac 19" Color Display** (\$4,799) — it's the best non-Trinitron display we've seen in MacUser Labs, ever. Both SuperMac displays include a QuickDraw accelerator in their 24-bit versions.

If you'd prefer a 24-bit-color system, we recommend that you purchase one of the above systems with a 24-bit card. But if you're not sure whether you want 8- or 24-bit video, the **Sigma Designs ColorMAX 8/24** (\$6,295) is a smart choice. Its 8-bit video card contains all the necessary electronics for 24-bit video, and the video RAM needed for the upgrade costs less than \$500.

One monitor we can't recommend is the **E-Machines ColorPage 15** (\$2,095). It uses Zenith's new Flat Tension Mask technology, which produces a perfectly flat screen, and it has superior glare protection. Unfortunately, these very assets combine to produce a very dim display with the worst focus and color quality of all the monitors. Until these problems are solved, steer clear.

Color Hardcopy To The Macs.



Once you've created that breathtaking color masterpiece or designed the winning presentation on your Macintosh™ II, bring those colors to life. For brilliant color hardcopy, choose a Mitsubishi® color thermal printer.

Mitsubishi printers can be used with virtually all Macintosh II-based applications. These printers are easy to use and will excel in any Mac II environment where high quality, color hardcopy is essential.

The G330, G370 and G650 color thermal transfer printers unleash all the bold, bright colors of your designs—every time. And for near-photographic quality, the S340 sublimation printer utilizes a state-of-the-art "dye-diffusion" process capable of printing up to 16.7 million colors. The S340

received the 1989 MacUser Magazine Editors' Choice Honorable Mention Award for Most Significant Hardware Product.

Mitsubishi color thermal printers are the logical choice for a wide variety of Macintosh II color graphic applications including graphics design, business graphics and all other color imaging applications. You'll get color to the Macs!



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	Small Apple	Small E-Machines	Small E-Machines	Small E-Machines TX	
Mouse rating	AppleColor High- Resolution RGB	ColorPage 15	ColorPage T16		
	\$\$\$\$\frac{1}{2}	\$\$\frac{1}{2}	****	****	
Comments	Very good MTF and excellent focus. No glare protection or software. Poor warranty.	Dim. Fair MTF, poor focus. Worst color quality. Flat screen. Best glare protection. Excellent software.	Brightest. Excellent MTF, focus, convergence, and software.	Bright. Very good MTF. Excellent convergence and software. High dpi: large screen area. Expensive.	
List price*			Britis -	1106	
Mac II system, 8-bit	\$1,647†	\$2,095	\$3,595	\$4,495	
Mac II system, 24-bit	, NA	NA	NA	\$6,490	
Mac SE/30 system, 8-bit	NA	NA	NA	\$4,495	
Monitor specifications	Com Tibilian	7- W First Transfer Mark			
Tube manufacturer and type	Sony Trinitron	Zenith Flat Tension Mask	Sony Trinitron	Sony Trinitron	
Dot pitch (millimeters)	0.25 mm	0.3 mm	0.26 mm	0.26 mm	
CRT size (diagonal [in.])	13 in.	15 in.	16 in.	16 in.	
Active screen size (diagonal [in.])	11.5 in.	13 in.	14.5 in.	15 in.	
Screen dimensions (W x H [pixels])	640 x 480	768 x 576	832 x 624	1,024 x 808	
Resolution (dots per inch)	69 dpi	72 dpi	72 dpi	87 dpi	
8-bit color modes	2, 4, 16, 256	2, 16, 256	2, 16, 256	2, 256	
24-bit color modes	NA	NA	NA	2, 4, 16, 256, thousands, millions	
Vertical scan rate (hertz)	66.7 Hz	67 Hz	67 Hz	72 Hz	
Horizontal scan rate (kilohertz)	35 kHz	46 kHz	45 kHz	60.97 kHz	
Controls			E A	NOW F	
Power switch	rear	rear	front	front	
Power indicator	front	front	front	front	
Brightness/contrast	right	right	front (contrast only)	front (contrast only)	
Degaussing	rear	automatic at power-up	automatic at power-up	automatic at power-up	
Convergence	rear	none	front	front	
Other Antiglare treatment	none	OCLI AR panel	silica coating	silica coating	
Tilt/swivel stand	no	yes	yes	yes	
Video-cable length (feet)	3.3 ft	6 ft	6 ft	6 ft	
Power consumption (watts)	160 watts	160 watts	220 watts	175 watts	
Case dimensions (W x H x D [in.])	13.62 x 11.75 x 15.75	14.75 x 14 x 15.36	16 x 17 x 17.7	16 x 17 x 17.7	
Weight (pounds)	34 lb	40 lb	59.4 lb	60 lb	
Software	no	yes	yes	yes	
Warranty	90 days	1 year	1 year	1 year	
Manufacturer	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	E-Machines, Inc. 9305 S.W. Gemini Drive Beaverton, OR 97005 (503) 646-6699	E-Machines, Inc. 9305 S.W. Gemini Drive Beaverton, OR 97005 (503) 646-6699	E-Machines, Inc. 9305 S.W. Gemini Dri Beaverton, OR 97005 (503) 646-6699	

^{*}Many manufacturers also sell the monitors and cards separately. 'Apple also has a 4-bit video card (\$499) and a 4-bit expansion kit (\$149).

Just How Good Is The Let Us Lay It A

resenting the world's first true publishing program. The first to give you the tools, power, and precision to publish documents that far exceed the look, quality, color, and professionalism formerly associated with desktop publishing. Presenting the new QuarkXPress 3.0. Just how good is it? Well, you're looking at it.



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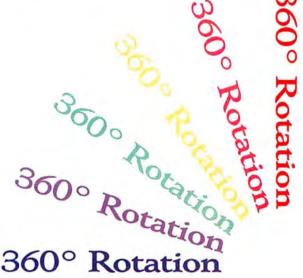
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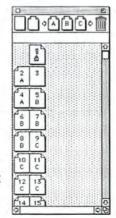
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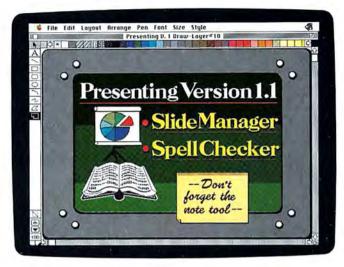


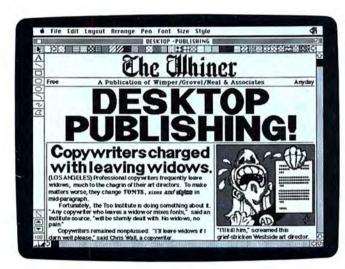
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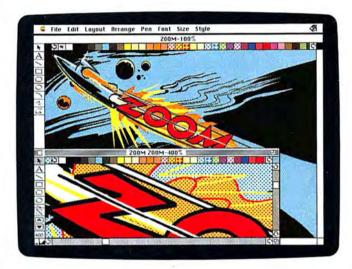
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Nobody reads copy anyway. MacDraw°II.





Mouse rating	Small MacProducts Magic View	Large CalComp DrawingCard Graphics Display	Large	Large Generation X CT-II	Large MegaGraphics MegaScreen 2008
			E-Machines T19		
List price*				777	March 1
Mac II system, 8-bit	\$895	\$6,395	\$5,995	\$3,999	\$5,948
Mac II system, 24-bit	NA ⁹	\$8,595	\$8,090	\$4,999 (T-24gx)	\$9,148
Mac SE/30 system, 8-bit	\$999	NA	\$5,995	\$3,999 (CT/30)	\$6,198 (3008 model
Monitor specifications		(a) (i) = (Y762-3
Tube manufacturer and type	Philips shadow mask	Hitachi INVAR shadow mask	Sony Trinitron	Ikegami-Sony Trinitron	Sony Trinitron
Dot pitch (millimeters)	0.29 mm	0.28 mm	0.31 mm	0.31 mm	0.31 mm
CRT size (diagonal [in.])	14 in.	21 in.	19 in.	20 in.	19 in.º
Active screen size (diagonal [in.])	12.85 in.	19.25 in.	17.25 in.	17.7 in.	17.5 in.
Screen dimensions (W x H [pixels])	640 x 480	1,152 x 870	1,024 x 808	1,024 x 768	1,024 x 826
Resolution (dots per inch)	72 dpi	72 dpi	75 dpi	72 dpi	75 dpi
8-bit color modes	2, 4, 16, 256	2, 4, 16, 256	2, 256	2, 4, 16, 256	2, 4, 16, 256
24-bit color modes	NA	2, 4, 16, 256, millions	2, 4, 16, 256, thousands, millions	2, 4, 16, 256, millions	2, 4, 16, 256, million
Vertical scan rate (hertz)	66.7 Hz	75 Hz	71.3 Hz	75 Hz	69 Hz
Horizontal scan rate (kilohertz)	35 kHz	70 kHz	60.24 kHz	60 kHz	60 kHz
Controls			A CONTRACTOR OF THE PARTY OF TH	1 3 1	
Power switch	front	front	front panel	front	front
Power indicator	front	front	front	front	front
Brightness/contrast	front	front	front (contrast only)	front	front (contrast only)
Degaussing	automatic at power-up	front	automatic at power-up	right	automatic at power-u
Convergence	none	none	front	right	front
Other Antiglare treatment	none	Asahi Glass AR panel	OCLI-type AR panel	OCLI-type AR panel	OCLI-type AR panel
Tilt/swivel stand	yes	yes	yes	yes	yes
Video-cable length (feet)	5.3 ft	6 ft	6 ft	6 ft	5 ft
Power consumption (watts)	85 watts	150 watts	220 watts	150 watts	150 watts
Case dimensions (W x H x D [in.])	14 x 15.5 x 16	19.5 x 19 x 20.5	19 x 19 x 21	19 x 19.5 x 21	19 x 19 x 21
Weight (pounds)	34 lb	81.4 lb	86 lb	85 lb	76 lb
Software	no	по	yes	yes	yes (as of April '90)
Warranty	monitor, 2 years card, 1 year	1 year	1 year	1 year; 24-bit board, 3 years	1 year
Manufacturer	MacProducts USA, Inc. 8303 Mopac Expy. Suite 218 Austin, TX 78759 (800) 622-3475 (512) 343-9441	CalComp, Inc. 2411 W. La Palma Ave. Anaheim, CA 92801 (800) 225-2667 (714) 821-2000	E-Machines, Inc. 9305 S.W. Gemini Drive Beaverton, OR 97005 (503) 646-6699	Generation X Technologies 333 W. El Camino Real, Suite 310 Sunnyvale, CA 94087 (800) 448-8231 (408) 739-4570	MegaGraphics, Inc. 439 Calle San Pablo Camarillo, CA 93010 (800) 423-0183 (805) 484-3799

^{*}Many manufacturers also sell the monitors and cards separately.

MacProducts will offer a 24-bit system in June 1990.
A 16-inch system is also available.

All These Videos Were Created By A Mouse

COLOR SPACE III

If you can point and click, you can produce professional quality color videos with ColorSpace IIi. The video card that lets you overlay anything created on a Mac II onto live or recorded video.

ColorSpace IIi's

advanced genlocking technology assures crisp, highquality images by synchronizing Mac graphics, titles, and animations to any standard TV video signal. You can even digitize still images from a video camera.

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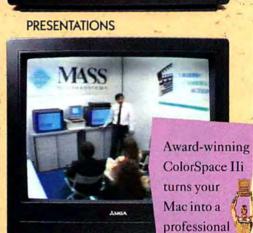


EDUCATION





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desktop

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get as sophisticated as you want. Because it works with all the most powerful Mac software—HyperCard,™ SuperCard,™ and Director.™

All of which makes ColorSpace IIi the technology of choice for today's desktop video applications: animations; film and commercial storyboards; sales/promotional/instructional videos.

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COLOR: MONITORS



Mouse rating	PCPC II 19" Color Graphics System	PCPC II 21" Color Graphics System	Radius Color Display	RasterOps 708+ Display
Comments	16-bit SE/30 system. Stepping Out II software. Annoying flicker.	Very good MTF. Excellent color. Poor gray linearity. Noticeable flicker. Stepping Out II software. 16-bit SE/30 system.	Dim. Low MTF but good focus. Fair convergence. Displays two A4 pages. Excellent software. 24-bit model has optional QuickDraw accelerator.	Very good MTF. Poor gr linearity. No degaussing control. Hardware pan, zoom, virtual desktop.
List price*	December 1	DELL'	THE STATE OF THE S	
Mac II system, 8-bit	\$3,658**	\$3,658**	\$6,190 (GS/C card)55	\$5,790
Mac II system, 24-bit	\$4,858	\$4,858	\$8,390 (DirectColor/24 card)	\$7,995
Mac SE/30 system, 8-bit	\$4,358 (16 bits)	\$4,358 (16 bits)	NA	\$5,790
Monitor specifications Tube manufacturer and type	Sony Trinitron	Hitachi INVAR shadow mask	Sony Trinitron	Sony Trinitron
Dot pitch (millimeters)	0.31 mm	0.28 mm	0.31 mm	0.31 mm
CRT size (diagonal [in.])	19 in. ⁰	21 in.	19 in.	19 in.0
Active screen size (diagonal [in.])	17.75 in.	18.75 in.	17.75 in.	17.75 in.
Screen dimensions (W x H [pixels])	1,024 x 768	1,024 x 768	1,152 x 882	1,024 x 768
Resolution (dots per inch)	72 dpi	68 dpi	82 dpi	72 dpi
8-bit color modes	2, 4, 16, 25611	2, 4, 16, 256††	2, 16, 256	2, 4, 16, 256
24-bit color modes	2, 4, 16, 256, millions	2, 4, 16, 256, millions	2, 256, thousands, millions	2, 4, 16, 256, millions
Vertical scan rate (hertz)	60 Hz (72 Hz now available)	60 Hz (72 Hz now available)	72 Hz	75 Hz
Horizontal scan rate (kilohertz)	49 kHz	49 kHz	65 kHz	60 kHz
Controls Power switch	front	front	front	front
Power indicator	front	front	front	front
Brightness/contrast	front (contrast only)	front	front (contrast only)	front (contrast only)
Degaussing	automatic at power-up	front	automatic at power-up	none
Convergence	front	none	front	front
Other Antiglare treatment	OCLI-type AR panel	Asahi Glass AR panel	OCLI-type AR panel	OCLI-type AR panel
Tilt/swivel stand	yes	yes	yes	yes
Video-cable length (feet)	4 ft	4 ft	6 ft	5.7 ft
Power consumption (watts)	220 watts	275 watts	220 watts	330 watts
Case dimensions (W x H x D [in.])	19 x 19 x 21	19.5 x 19 x 20.5	19 x 19 x 21	19 x 19 x 21
Weight (pounds)	85 lb	80 lb	85 lb	84 lb
Software	yes	yes	yes	yes
Warranty	1 year	1 year	1 year	1 year
Manufacturer	Personal Computer Peripherals Corp. 4710 Eisenhower Blvd. Bldg A4 Tampa, FL 33634 (800) 622-2888 (813) 884-3092	Personal Computer Peripherals Corp. 4710 Eisenhower Blvd. Bldg. A4 Tampa, FL 33634 (800) 622-2888 (813) 884-3092	Radius 1710 Fortune Drive San Jose, CA 95131 (800) 227-2795 (408) 434-1010	RasterOps 2500 Walsh Ave. Santa Clara, CA 95051 (800) 468-7600 (408) 562-4200

^{*}Many manufacturers also sell the monitors and cards separately.

A 16-inch system is also available.

*For \$1,479, the 8-bit card can be upgraded to 24 bits; the card must be returned to PCPC for upgrading.

*The 16-bit \$E/30 system supports 2, 4, 16, 256, thousands.

System also available with the DirectColor/8 card, which is upgradable by using the 8-bit DirectColor Memory Expansion Kit (\$1,095).

"I Want My MacTV"

COLORSPA

You'll want your MacTV, too—interactive-multimedia. Live, full-color, flicker-free video in a window on your Mac monitor. And the only way to get it is with Color-

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COLOR: MONITORS



	Large RasterOps Calibrator	Large Relax Ikegami Trinitron	Large Sigma Designs ColorMAX 8/24	Large SuperMac 19" Color Display	Large SuperMac 19" Trinitron Color Display
Mouse rating	\$\$\$\frac{1}{2}	\$\$\$\frac{1}{2}	\$\$\$\$\frac{1}{2}	***	\$\$\$\$ ¹ / ₂
Comments	Good MTF but fair focus. Warmest white. Annoying flicker. Superior software, plus hardware pan, zoom, virtual desktop. Expensive.	Excellent MTF. Fair convergence. Annoying flicker. Most nuisances. No software.	Good general- purpose system. 8-bit card easily upgraded to 24 bits. No software or degaussing control.	Bright. Warm white. Worst gray linearity. Hardware pan, zoom, virtual desktop. 24-bit system includes OuickDraw accelerator.	Fair MTF but very good focus. Hardwar pan, zoom, virtual desktop. 24-bit system includes QuickDraw accelerator.
List price*	E				
Mac II system, 8-bit	\$9,995	\$4,995	\$6,295₩	\$4,799	\$5,799
Mac II system, 24-bit	\$12,500	NA	\$6,295 + \$32000	\$7,699	\$8,699
Mac SE/30 system, 8-bit	NA	NA	NA	NA	NA
Monitor specifications				P. In	
Tube manufacturer and type	Matsushita shadow mask	Ikegami-Sony Trinitron	Sony Trinitron	Hitachi INVAR shadow mask	Sony Trinitron
Dot pitch (millimeters)	0.31 mm	0.31 mm	0.31 mm	0.31 mm	0.31 mm
CRT size (diagonal [in.])	19 in.	20 in.	19 in.	19 in.	19 in.
Active screen size (diagonal [in.])	18 in.	17,5 in.	18 in.	18 in.	17.62 in.
Screen dimensions (W x H [pixels])	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768
Resolution (dots per inch)	72 dpi	72 dpi	72 dpi	72 dpi	72 dpi
8-bit color modes	2, 4, 16, 256	2, 4, 16, 256	2, 4, 16, 256	2, 4, 16, 256	2, 4, 16, 256
24-bit color modes	2, 4, 16, 256, millions	NA	2, 4, 16, 256, millions	2, 4, 16, 256, millions	2, 4, 16, 256, million
Vertical scan rate (hertz)	60 Hz (75 Hz now available)	60 Hz	79 Hz	75 Hz	75 Hz
Horizontal scan rate (kilohertz)	49 kHz (60 kHz now available)	48 kHz	64 kHz	60.24 kHz	60.24 kHz
Controls					
Power switch	front	front	front	front	front
Power indicator	front	front	front	front	front
Brightness/contrast	front and DA	front	front (contrast only)	front	front (contrast only)
Degaussing	front and DA	right	none	automatic at power-up	automatic at power-
Convergence	none	right	front	none	front
Other	198	10	ALC: L	Mile .	Marin -
Antiglare treatment	silica coating	OCLI-type AR panel	OCLI-type AR panel	Asahi Glass AR panel	OCLI-type AR panel
Tilt/swivel stand	yes	yes	yes	yes	yes
Video-cable length (feet)	5.7 ft	6 ft	5.5 ft	5 ft	5 ft
Power consumption (watts)	180 watts	150 watts	220 watts	135 watts	220 watts
Case dimensions (W x H x D [in.])	19 x 19 x 23	19 x 19.5 x 21	19 x 19 x 21	19 x 19 x 20	19 x 19 x 21
Weight (pounds)	81.4 lb	85 lb	85 lb	64 lb	97 lb
Software	yes	no	no	yes	yes
Warranty	1 year	1 year	1 year	1 year	1 year
Manufacturer	RasterOps 2500 Walsh Ave. Santa Clara, CA 95051 (800) 468-7600 (408) 562-4200	Relax Technology 3101 Whipple Road Suite 22 Union City, CA 94587 (800) 848-1313 (415) 471-6112	Sigma Designs, Inc. 46501 Landing Freeway Fremont, CA 94538 (415) 770-0100	SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 (408) 245-2202	SuperMac Technolo 485 Potrero Ave. Sunnyvale, CA 9408 (408) 245-2202

^{*}Many manufacturers also sell the monitors and cards separately.

*Sigma's 8-bit card is upgradable to 24 bits by addition of 16 Toshiba VRAM chips (about \$20 each); total upgrade price may be higher.



MacUser Labs tests the full spectrum of color printers and finds that the leap from color screen to color page has never been easier.

Color on the Page

By Phillip Robinson and the MacUser Labs staff ack in the late '80s — October '88, to be exact — we tested the only two serious color printers then available to Mac users — the QMS ColorScript 100 and the Tektronix 4693D. Both were big, heavy, and expensive. Neither worked smoothly with all the applications we tried. Other manufacturers were waiting for a firm color standard from Apple before entering the color

market. The breakthrough came in April '89 with the release of 32-bit QuickDraw.

The '90s will be the Color Decade. In the past 12 months, waves of color applications, display systems, and printers have appeared. Most take advantage of Apple's new color standard. Today you can choose from more than two dozen color printers

at prices ranging from \$1,500 to \$75,000.

MacUser Labs tested 14 members of the new generation of color printers. We looked at representatives from the three major color technologies: inexpensive inkjets, thermal-wax-transfer workhorses, and state-of-the-art sublimal-dye-transfer printers that produce images of almost photographic quality (see Figure 1). We spent more than a thousand hours in our lab, evaluating everything from printing speed to image quality. Five other printers also passed through our lab but were kept separate from the others for various reasons (see the "More Color, Anyone?" sidebar).

To separate the crayon scribblers from the polished painters, we printed test pages that included color transitions (gradients), color-range samples, fine lines, curves, and text of different sizes. We also printed scanned color photographs, a PageMaker





When Does 4 Equal 16 Million?

Despite differences in technology, all color printers use three primaries: cyan, magenta, and yellow (CMY). Some add a fourth, black (K). Although it's possible to mix equal amounts of the CMY primaries to make black, the result isn't as rich or dark as a pure black. From these three or four colors, printers — and the software that drives them — create millions of additional colors by dithering.

Inkjets shoot minute drops of ink onto a page, and thermal printers apply drops of melted wax or plastic. These drops create tiny dots. Each individual dot is so small that your eye blends neighboring dots together. If the dots are different colors, you'll perceive another color—one that's not really there. For example, a black dot next to a white dot is seen as a larger gray dot. A cyan dot joins a yellow dot to produce green. This is the basis of dithering.

The number of dots laid down per inch determines a printer's resolution — the higher the resolution, the crisper the image. All the inkjets print 180 dpi (dots per inch) except the Tektronix ColorQuick, which squeezes 216 dpi out of its 180-dpi Sharp JX-730 print engine. Most thermal-wax printers can produce 300 dpi. The CalComp Plot-Master and Lasergraphics CPS are exceptions, printing 203 dpi horizontally and 200 dpi vertically.

Because each individual dot can be any one of four colors, the total number of colors that can be shown by a pair of dots equals 4 times 4, or 16 colors. There's no limit to the size or shape of a dither group; any pattern is possible if your software is up to it. A dither square of 8 dots on a side can produce 16,777,216 colors — the upper limit of 32-bit QuickDraw.

As you might guess, the difference between reds #1,000,000 and #1,000,001 is minuscule. The amount of difference between two colors is influenced by the size of the printer's gamut - the array of all possible colors that the printer can produce (see Figure 2). A large gamut, or color range, allows a wider variety of colors than a small gamut. (The total number of colors, however, is limited to the 16.8 million produced by dithering.) The three Tektronix printers - the Color-Ouick, 4693DX, and Phaser CPS - have the largest color gamuts. They produce consistently vivid colors over a broad range of hues. The Hewlett-Packard

layout, and a Persuasion chart. We used different drivers, printed on paper and transparencies, and clocked speeds. We turned a spectrophotometer on the colors. Finally, we asked a jury pulled from *MacUser's* experienced, skeptical art department to judge some prints side by side.

Color Whose World?

Not everyone needs color printing. If you spend your day word processing, crunching numbers, or managing a database, save your green and stick to black and white. But if you prepare presentations, color can impart that extra punch to your handouts or overhead projections. If you're a desktop publisher, designer, or artist, you need color proofs (sample prints) to check hues, intensities, and the overall appearance of color compositions.

Simple presentations demand less from

a printer than do proofs. A day in the boardroom isn't ruined if the red on a bar chart isn't precisely the same red you saw on your Mac. However, more-complex presentations — with scanned images, intricate diagrams, logos, or 3-D models — demand more from a printer: sharp line edges, smooth color transitions, and crisp fonts.

If you're choosing a printer for color proofs, don't be scared off by price — think instead of the time and money you'll save. A high-quality Cromalin color proof from an outside service costs between \$50 and \$100, and you have to wait three to five days before you see your image. In minutes, an inkjet or thermal-wax printer can give you a rough idea for 25 to 50 cents per page; a sublimal-dye printer takes about the same amount of time to give you near-Cromalin results for less than \$5.

Figure 1: Three Faces of Color

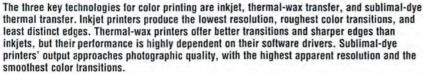
Inkjet





Sublimal-dye thermal transfer





effect.

PaintJet XL and Shinko CHC-345 suffer from a narrow range of possible colors.

All printers face a dual challenge when dithering: pattern choice and resolution. If a 64-dot group is half cyan and half yellow, should it be a square with all the cyan dots on one side and all the yellow ones on the other? Or should the dots be distributed in a checkerboard pattern throughout the group? How about a random distribution? The three patterns look astonishingly different when repeated many times across a printed page.

A bad dither pattern can create banding, distracting patterns, or blurring in a print. But there's no one best dither for all uses. Different types of images look best with different dithers. For example, the randomized Floyd-Steinberg dither — included in the software drivers for the Sharp JX-730, CalComp PlotMaster, and Lasergraphics CPS — is generally regarded as best for scanned photographic images. The more ordered Bayer dither included with the same printers works especially well for images of flat, untextured surfaces.

PostScript provides only one dither, a pattern that mimics traditional halftone printing. The printers we tested outputted at 300 dpi, however, less than one-fourth

the resolution of a typical halftone color separation (as used in this magazine). Images printed with the PostScript dither look like halftone images as they would appearunder a powerful magnifying glass. The PostScript clone in the Tektronix Phaser CPS uses an entirely different dither to avoid this

Dithering degrades a printer's resolution, and low resolution can destroy text or fine lines. When printing a pure primary (or black), a printer can call on its entire resolution to smooth a line or font. To produce a diagonal line, for instance, it can step up one dot at a time as the diagonal rises across the page. But when an 8 x 8 dither is the basic printing unit, a new block can be added only every

eight dots. The apparent resolution is then one-eighth of the original. With a 300-dpi printer, for example, dithering with 8 x 8 blocks cuts apparent resolution to a mere 37.5 dpi.

Instead of laying down individual dots, the Mitsubishi S340-10 uses dye sublimation - that is, it vaporizes dyes, which blend with each other as they soak into the page (see the "How They Work" sidebar). A sublimaldve printer doesn't need to dither to make millions of colors, because it can mix varying amounts of primary colors in each dot. Although the S340-10 starts at only 150 dpi, its apparent resolution is higher than that of printers that must trade resolution for dithering.

RIP It Up

Choosing dither patterns is one of the duties of a complex combination of hardware

and software known as a RIP (rasterimage processor). The RIP's job is to translate the image you see on-screen into the dots of ink, wax, plastic, or dye that form the same image on the printed page. Depending on the software, the RIP's work is done in the printer or in a

More Color, Anyone?

Not satisfied with MacUser's selection of 14 color printers? Here are a few more ways to get color out of your Mac.

If your printing needs are small — literally — the postcard-sized images of the Kodak SV6510 Color Video Printer (\$4,500) might be right for you. Although its 137-dpi resolution is slightly lower than that of the Mitsubishi S340-10, our tests showed that the sublimal-dye Kodak produced output that was just as good (and at times better). The SV6510 can also serve as an image-capture and -processor device. You can connect a Kodak CCD 1000 RGB camera, a Kodak SV5035 Slide/Video Transfer Unit, or any other RGB or NTSC video source and upload PICT images to the Mac. Eastman Kodak Co., 343 State St., Rochester, NY 14650; (800) 445-6325, ext. 110.

The soon-to-be-released Kodak XL7700 (\$25,000) is a 200-dpi sublimal-dye printer that will produce 11-x-11-inch images as crisp and vivid as any we've seen. At the top end of sublimal-dye printing is the DuPont 4Cast (\$75,000), which prints at 300 dpi in sizes up to 11 x 17 inches. The 4Cast includes a software-based PostScript RIP from Adobe. DuPont, 600 Eagle Run Road, Route 273 NI95, Newark,

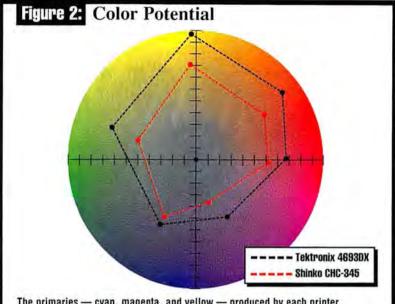


Macintosh/printer combination.

Many printers let you select RIP software (see Table 1). When better RIP software is released, you can upgrade these printers' performance simply by installing a new RIP driver.

The most familiar RIP software comes with the PostScript page-description language, which is used by the Océ Graphics and QMS printers. PostScript printers produce smooth graphics and high-quality text (using 35 built-in, or resident, fonts), but PostScript can add several thousand dollars to a printer's price. For instance, the \$9,995 QMS ColorScript 100, with PostScript, uses the same print engine as the non-PostScript \$5,995 Mitsubishi G370-10. The Tektronix Phaser CPS avoids this extra expense by using a PostScript clone that works as well as the real thing except that it chokes on Adobe's encrypted Type 1 fonts. True PostScript printers are faster than other color printers, since the PostScript RIP does all of its work in printer hardware rather than on the Mac.

All the other printers use RIPs that are based solely on QuickDraw, the imaging technique that Apple builds into each Mac's ROM. QuickDraw requires the Mac to perform all the rasterizing calculations and uses only software-based outline fonts, as opposed to resident fonts. The Hewlett-Packard PaintJet and PaintJet XL, Tektronix ColorQuick and 4693DX, and Seiko CH-5504 all provide proprietary RIP software. The CalComp



The primaries — cyan, magenta, and yellow — produced by each printer determine the range of colors it can produce. We used a Minolta CM-1000 spectro-photometer to measure these primaries along with red, green, and blue and used the results to produce a map called a *color gamut* for each printer. The larger the gamut, the greater the range of colors a printer can produce. The Tektronix 4693DX Color Image had the largest gamut, and the Shinko CHC-345 had the smallest. Figure 5 includes a chart showing the color range of all the printers.

PlotMaster and Sharp JX-730 come with Cricket Expressions, which allows you to choose from eight dither patterns and 35 outline fonts. The Shinko CHC-345 comes with ColorOut, a relatively straightforward one-dither, no-font RIP driver from GMS, which promises more fonts and

features in the future. (As we went to press, GMS announced a five-dither—but still fontless—version). The Laser-graphics CPS comes with the MacRascol driver. This powerful RIP includes 9 dithering patterns; 8 outline fonts, with an option for 35 more; and many settings

DE 19702; (302) 733-9103.

We also looked at a video printer from Toyo, the TPG-4300/MP (\$9,985). A video printer doesn't need a RIP, because it takes the video signal from the Mac's video card and rasterizes the RGB signal into a bit-mapped image. Video printers are fast, and the thermal-wax Toyo is no exception — it captures images in less than a second and prints in less than a minute. CalComp, Hitachì, Mitsubishi, Panasonic, and Seiko make video-capture printers as well. Toyo, 2934 Corvin Drive, Santa Clara, CA 95051; (408) 720-8877.

Two other new printers we looked at introduce a significant variation on current technology. In addition to varying the *number* of dots of each color in a dither pattern, the Canon FP-510 (\$4,995) and Panasonic EPL 8543 (\$7,995) can vary the relative *size* of each dot. They have great control over colors without needing large and complex dither patterns that lower resolution.

The interface and RIP for the Canon FP-510 inkjet were not ready in time for our tests. Although the FP-510 has a physical resolution



Kodak SV6510 printer and accessories

of only 160 dpi, it produced the smoothest color gradients of any inkjet we tested. It includes Freedom of Press and a serial connection. Canon USA, One Canon Plaza, Lake Success, NY 11042; (516) 488-6700.

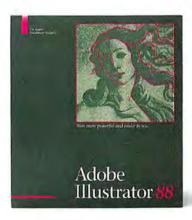
The Panasonic EPL 8543 is a thermalwax printer with a resolution of 203 dpi. We experienced interface problems with our prerelease unit, but once this problem has been solved (and we assume it will be), the Panasonic should set the standard for color printers. Prints from the EPL 8543 rivaled

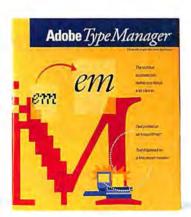
those from the sublimal-dye Mitsubishi S340-10 — for \$6,000 less. Panasonic, 2 Panasonic Way, Secaucus, NY 07094; (201) 348-7000.

The Iris 3024 (\$75,000) is the flagship of variable-dot technology. It prints images of up to 24 x 24 inches at 300 dpi on any water-accepting media — coated or uncoated paper, transparency, and even cloth. The output is simply photographic. Iris Graphics, 6 Crosby, Bedford, MA 01730; (617) 275-8777.

— Paul Yi

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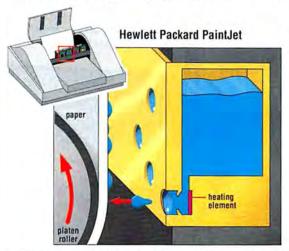




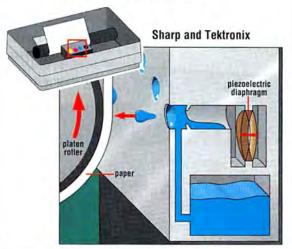


How They Work: Color Printers

Inkjets: Inkjet print heads move across the paper, laying down dots of ink to form lines of colors. Special clay-coated paper is needed to prevent the ink from spreading on the page. Inkjet resolution is related more to cost than to the technology itself.

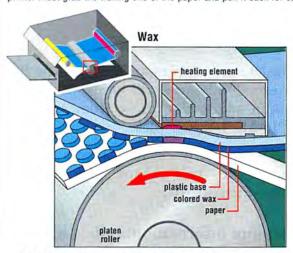


Hewlett-Packard PaintJets integrate the ink and the print head into one disposable cartridge. The ink is electrically heated and vaporized through 30 nozzles in each cartridge. Any ink that drys on the nozzle is cleaned manually with a built-in wiper. You simply replace clogged cartridges with new ones.

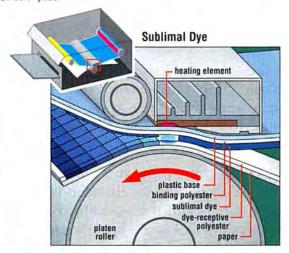


The Sharp JX-730 and Tektronix ColorQuick use pressure produced by a piezoelectric diaphragm to force ink onto the paper. This method consumes more ink than does the Hewlett-Packard process and produces richer colors. To prevent clogging, a five-minute cleaning cycle flushes the nozzles each time the machine is turned off.

Thermals: Colored wax, plastic, or sublimal dye comes on plastic ribbons in page-sized blocks of cyan, yellow, magenta, and sometimes black. Since a printing pass is made for each color, accurate registration is crucial. The printable area is limited, because the printer must grab the trailing end of the paper and pull it back for each color pass.

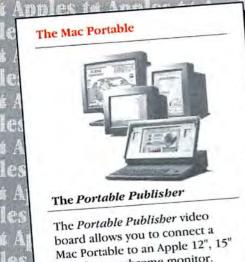


A thermal-wax head melts colored wax or plastic onto smooth paper. The dye is transferred by mechanical pressure between the head and the platen roller. The paper is then peeled away; the unmelted wax remains on the ribbon; and the melted dye sticks to the paper, resulting in a glossy image.



When a sublimal dye is heated, it changes from a solid directly into a gas in a process called sublimation. The gaseous dye diffuses in the chemical coating of the receiving paper and reverts to a solid. The amount of dye transferred depends on the temperature of the heating element. Because the intensity of each color is controlled, and because sublimal dyes may be laid on top of each other, dithering is not required to create a full range of colors.

- Paul Yi



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and controls for color-value adjustment and color replacement.

Freedom of Press from CAI provides the advantages of PostScript for Quick-Draw printers. It converts PostScript code to a format that QuickDraw printers can understand and print. Although Freedom of Press isn't bundled with any of the printers we tested, it can be added as an option to many. Freedom of Press provides excellent output and includes Bitstream equivalents of the standard 35 PostScript fonts, but it's somewhat clumsy to use and the roundabout imaging process ties up the Mac. Using it is also slower than using a PostScript printer; the results are impressive, however (see StartUp Reviews, January '90).

Making the Connection

Before you can enjoy your chosen RIP, you first face the chore of connecting your color printer to your Mac. Both the Hewlett-Packard PaintJet and PaintJet XL have serial interfaces that connect to the Mac's printer port, although the XL

is twice as fast, at 19,200 bps (bits per second). The Sharp JX-730 offers two interface options: the \$125 Paralink serial-to-parallel converter from Jonathan Freeman Technologies and the slightly faster \$195 Hurdler II-CPI Nu-Bus card from Creative Solutions. The Tektronix Color-Quick uses a fast and simple SCSI connection.

The three thermalwax printers with PostScript or a Post-Script clone built in - the QMS Color-Script 100, Océ 5232 CPS Color PS, and Tektronix Phaser CPS - connect to the Mac via a Local-Talk network and thus can be shared by other Macs. The Tektronix Phaser CPS can also spool and manage printing for as many as four other LocalTalk printers at once.

The non-PostScript printers are a more diverse lot to install. The Shinko requires a parallel NuBus card such as a Hurdler II-CPI or a Unigate from Computer Friends. The Tektronix 4693DX comes with a NuBus card and also accepts optional cards (available from Tektronix) that connect as many as four Macs without a network. The Mitsubishi G370-10 and S340-10 both require a parallel NuBus card, but neither the card nor the required RIP driver software are included with either Mitsubishi printer — you must shop for them yourself.

The Lasergraphics and Seiko connect to the Mac's SCSI port through an external SCSI/parallel converter box. The CalComp PlotMaster ships with a 19,200-bps serial interface, but we recommend the parallel option, because it can cut print times in half. The Seiko is the toughest installation of all, from the mother-board that has to be slipped and screwed into place, to the manual settings on the front panel.

Media Watch

If you're bothered by the process of changing toner in your LaserWriter, be prepared for even more colorful complications when you move up to a color printer — especially if you choose an inkjet. An inkjet refill operation can threaten not only your patience but also your wardrobe. For instance, the Sharp and Tektronix inkjets come with liquid inks that can splash during refilling or when the printer is moved.

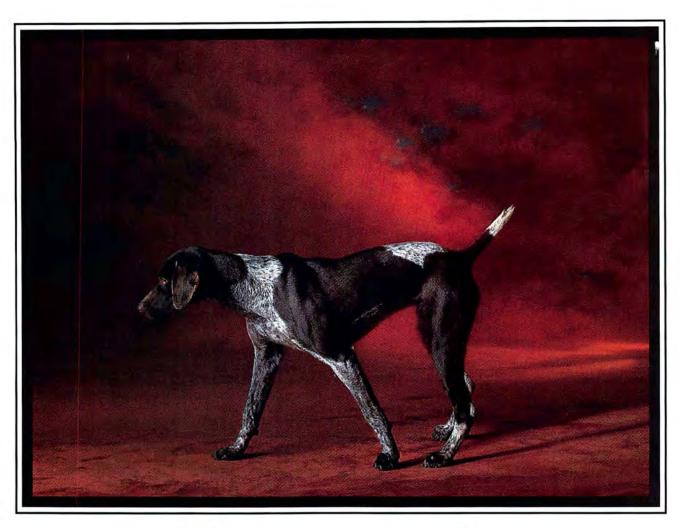
To prevent clogging, the JX-730 and the ColorQuick have a cleaning and priming cycle, which hums along for a few minutes after you've finished printing. The ColorQuick produces rich colors by using large amounts of ink, more than the PaintJets and the Sharp. The PaintJet and PaintJet XL combine the ink reservoir and the print head into disposable cartridges — one for each color in the XL and a single cartridge for all three colors in the PaintJet (along with one for black). You never touch the inks. When a nozzle clogs so badly that a quick wipe on the

Table 1: RIP Options

	Apple LaserWriter	ColorOut	Cricket Expressions	Freedom of Press	MacRascol	Proprietary
Inkjet	The second	2000	10000	Die -	1000	
Hewlett-Packard PaintJet		150		\$495	\$1,995	\$125
Hewlett-Packard PaintJet XL		RESIDE.	SELTIN .	\$495	Carry II	\$125
Sharp JX-730 Color Ink Jet		ASTRICT.	\$1251	\$690*		
Tektronix ColorQuick			Harris	\$690*		\$150
Thermal-wax transfer		THE PARTY NAMED IN	District Control			100
CalComp PlotMaster 5902A			\$495	\$495		
Lasergraphics CPS			The state of		included	1832
Mitsubishi G370-10		\$895*	Will Live	\$690*	\$3,190	
Océ Graphics 5232 CPS Color PS	included		GU			
QMS ColorScript 100 Model 10	included		ENT L		Ere :	B
Seiko CH-5504		The Control of the Co		\$495	\$1,995	included
Shinko CHC-345	2). 1	\$895*			20111 T	
Tektronix 4693DX Color Image	THE PLANT	a say to		\$495	to the same	\$495
Tektronix Phaser CPS	included				133	
Sublimal-dye thermal transfer Mitsubishi S340-10		\$895*		\$690*	\$1,995	

*Includes NuBus interface card (required for these Freedom of Press installations).
*Includes Paralink interface; \$195 version includes Hurdler II-CPI NuBus interface card.

The right RIP is an important ingredient in printer performance. Fortunately, you're not limited to the RIP software shipped with most printers. Third-party RIP software is available that can improve both speed and image quality. Look for RIPs with more features, fonts, and dithers to appear in the future and for prices to come down as the color-printer market continues to grow.



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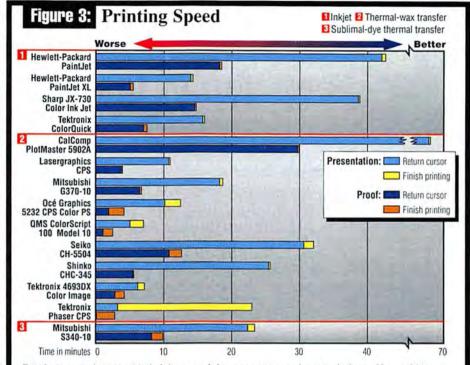


cleaning station built into the printer won't fix it, you just toss the cartridge and insert a new one. You pay for convenience, though: PaintJet cartridges cost five times as much as the JX-730 and ColorOuick refills.

The PaintJet has both friction and tractor-feed options for paper and transparencies; the PaintJet XL has an impeccable automatic sheet feeder. The JX-730 has only an inconvenient hand-loaded single-sheet paper feeder that is prone to crooked feeds. The ColorQuick comes with cut-sheet, manual singlesheet, and roll feeders that didn't misalign during our tests.

The thermal-wax and sublimal-dye printers share a similar ink scheme: the colored wax, plastic, or dye comes on wide rolled ribbons. (The sublimal-dye Mitsubishi S340-10 is the only printer that needs different ribbons for paper and transparencies.) The ribbons contain full-page rectangles of color, in repeating se-

quences of CMY or CMYK, that are used only once for a single page. All the cyan dots on a page are printed, the page is returned to its original position, the color roll moves to the next color rectangle, all the yellow dots are printed, and so on. You'll pay between 28 and 78 cents



Two factors are important in judging speed: how soon you regain control of your Mac and how long it takes for the page to print. We tested each printer on a complex PageMaker proof and a simple Persuasion presentation chart. The QMS ColorScript was the overall winner, with the Océ Graphics 5232 and Tektronix 4693DX close behind. The Tektronix Phaser CPS returned the cursor fastest, thanks to its spooling, but the complex proof taxed its PostScript-clone RIP. Although the inkjets were slower than most thermals, the real snail was the CalComp PlotMaster.

> (Lasergraphics, with wax, versus Océ, with plastic ink) per complete thermal image on paper. Transparencies cost three to four times as much. The Mitsubishi S340-10 is in a class by itself, with paper prints at \$4.80 each and transparencies costing \$5.60 apiece.

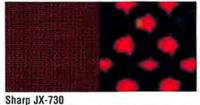
Color printers tend to have smaller potential print areas than do monochrome printers. On A-size paper (8.5 x 11 inches), the Tektronix Phaser and 4693DX have the smallest printable areas, at 8.1 x 8.3 inches. The Océ is only a tiny bit larger at 6.8 x 10 inches, but it's also the only

Figure 4: Color Accuracy

The colors a printer produces are affected by its media, dyes and inks, and dithering. To show how four different printers respond to the same input, we printed a "brown' from the same Canvas file and then magnified the dither pattern 20 times. Océ's PostScript dither uses more yellow than the others, whereas the Seiko's brown looks almost red. Like the Seiko, the Sharp JX-730 uses a generous amount of black, but its dither and ink combine to produce a darkbrown color. The Mitsubishi uses no dithering, and the result is a seemingly solid brown.



Océ Graphics 5232 CPS Color PS



Seiko CH-5504



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hard copy or transparency form. Everything your business needs to stand out from the crowd. All in a full spectrum of color for just \$9,995. The QMS ColorScript™ 100 Model 10 easily connects to your Mac® or PC to add full color and the power of true Adobe® PostScript to your business — and, at this price, it helps you stay in the black! It's another first from QMS® and a breakthrough in color PostScript® printers.

Show-stopping presentations, powerful

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1-800-523-2696. If improving your business edge is important to you, call our toll free number for the nearest Laser Connection® dealer. Your Laser Connection dealer can give you a demonstration and show you how the QMS ColorScript 100 Model 10 will add a colorful dimension to your presentations — and help keep you in the black.



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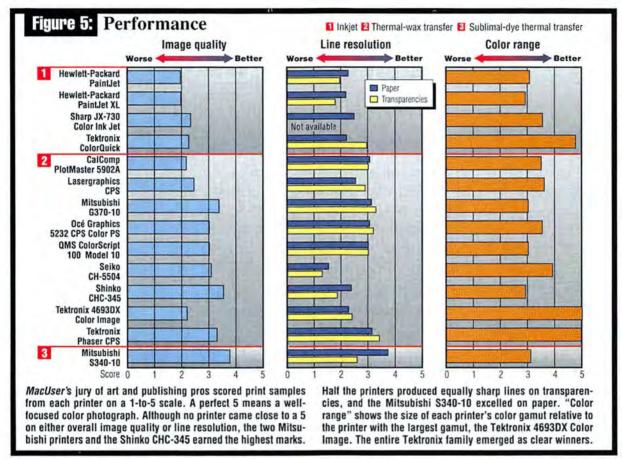
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1-800-523-2696

Please circle 181 on reader service card.

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printer able to print on B-size paper (11 x 17 inches), with an image size of 10 x 15 inches. The Seiko has the largest A-size print area, 8.25 x 10.7 inches, and can print an image of 8.53 x 11.9 inches — larger than letter-sized — on its own "Super A-size" paper. Some printers also have big brothers that accommodate B-size paper (see Table 2).

Our tests couldn't answer every question about ink and paper. For example, how long will the colors last on paper? Only the Océ makes a specific claim to use "archival" plastic ink. Will the ink smear or rub off after extended use? Thermal wax that sits on top of the page is in more danger than inkjet ink or sublimal dyes, which soak into the paper.

Someday My Prints Will Come

Even the fastest color printers are far slower than their monochrome cousins. Besides noting total printing time, we determined how quickly — or slowly — each printer returned control of the Mac before printing both simple and complex files (see Figure 3). Printers that RIP

internally turned out to be strikingly faster than those that process images inside the Mac. When preparing to print a simple, undithered PICT file, for example, the sluggish CalComp PlotMaster — which uses a software RIP inside the Mac — took a thousand times longer to return control of the Mac than did the speedy Tektronix Phaser CPS.

The Phaser CPS has a hard-disk spooler that quickly soaks up the image from the Mac and gives the cursor back faster than any other printer we tested. The Phaser tied with the QMS ColorScript for first printer to finish the simple Persuasion page. On the more complex PageMaker page, however, the Phaser's PostScript clone was not as swift as the Adobe original used by QMS.

Inkjet printers have two speeds, one for printing on paper and a slower one for transparencies. On paper, the PaintJet XL and the ColorQuick keep up with the average thermal printer, but the plain PaintJet (with its slow serial connection) and the Sharp JX-730 are among the slowest printers. They're kept out of the

cellar by the CalComp PlotMaster, which needed well over an hour to print the PageMaker document — most other printers were done in 10 to 20 minutes. What's worse, the PlotMaster tied up the Mac for all but the last few seconds of the printing process. On transparencies only the Hewlett-Packard PaintJet XL came close to the speed of the average thermal printer.

Looks Are Everything

After negotiating an obstacle course of hardware-installation tests, software-installation options, and clock watching, our intrepid technicians finally reached the heart of the matter: How good do the prints look?

When evaluating color prints, remember that WYSIWYG (what you see is what you get) color is still an unreachable ideal (see "Color Transformations" in this buyer's guide). The on-screen color may be only a distant relative of the color that shows up on the printed page (see Figure 4), but don't blame the printer alone. Your monitor, application, and driver software all have their own ideas

COME AND BROTHINGS

"WHEN
WE NEED
TEMPORARIES
WHO KNOW
MACINTOSH
COMPUTERS,
I CALL KELLY.
THEY'RE
ALWAYS
QUALIFIED."



"We have a Macintosh® computer on almost every desk.
I've tried other temporary help companies and Kelly is the best. Kelly takes the time to make sure I get the kind of people that I need."



The Kelly Girl People - The First and The Best



about each color's hue and intensity. The dither pattern you choose may skew the apparent color. The light under which you are looking at the print also has an enormous effect on what color you perceive.

Tektronix has taken an important first step toward resolving this confusion with a process called TekColor (see "The TekColor Solution" sidebar in "Color Transformations" in this buyer's guide). TekColor knows the color tendencies of many popular monitors; just tell it which one you're using, and TekColor adjusts the ColorQuick's output accordingly. At press time, TekColor supported only the ColorQuick printer, but a version for the 4693DX should be out by now, with a Phaser CPS version on the way.

The Océ 5232 CPS and QMS ColorScript 100 use a different strategy for color

control. They are Pantone-certified —
that is, they produce colors that mesh
with the popular Pantone Matching System (see "The Pantone Touch" in this
month's DTP section). The Pantone system, widely used by designers and printers, provides a unique identification
number for hundreds of hues and tints.
You need a Pantone-licensed application
such as QuarkXPress or Adobe Illustrator to take full advantage of this feature.

Our spectrophotometer tests provided an objective analysis of each printer's potential color range. The larger the color range, the likelier it is that the printer can produce the color you want. Other attributes aren't as easily quantified, however, so we asked a jury of experienced publishing professionals to rate each sample image's overall appearance, line and text resolution, consistency, and edge definition.

For overall attractive output, our jury's first choice was the Mitsubishi S340-10 first, followed closely by the Shinko, the Mitsubishi G370-10, and the Phaser (see Figure 5). The PaintJets and PlotMaster finished last. The S340-10's images point to a future in which sublimal-dye printers

Figure 6: Text Quality

Sharp text requires high resolution. These examples of 12-point Times - actual size and magnified two times - exaggerate the differences among printers. Although the 180-dpi Hewlett-Packard PaintJet XL gets good results from its outline fonts, it can't compete with the higher resolution of 300-dpi thermal printers (or the LaserWriter IINTX). The Mitsubishi shows its 150-dpi weakness even when printing Freedom of Press outline fonts. At small font sizes, the QMS and Tektronix 4693DX produce similar output, even though the QMS uses PostScript and the Tektronix type is bit-mapped. At 60 points, however, the QMS type (shown at actual size) remains smooth and the Tektronix example shows jaggies due to a lack of bit-map information.

60 60 abc

12 - abcdef 12 abc

150 dpi — Mitsubishi \$340-10

12 - abcdef 12 abc

180 dpi — HP PaintJet XL

12 - abcdef 12 abc

300 dpi — QMS ColorScript 100

12 - abcdef 12 abc

300 dpi — Tektronix 4693DX

12 - abcdef 12 abc

300 dpi — Apple LaserWriter IINTX

turn out prints that rival photographs for smooth continuous colors.

If you want bright, vivid colors—especially the primaries so popular in presentations—all three Tektronix printers will fill the bill. The large Tektronix color gamuts play a role here, offering brighter, richer colors than the results most other printers can attain. If your presentations are more complex, the Phaser CPS is recommended for good line resolution on both paper and transparencies. The Seiko printer had by far the poorest line resolution on both media.

On paper, the Mitsubishi S340-10 sublimal-dye printer won the colored-line-resolution award by a wide margin. This is a bit surprising in view of its low 150-dpi resolution but points out how dithering reduces resolution for thermal-wax and inkjet printers. In a virtual tie for second — a distant second — came the CalComp, Tektronix Phaser, QMS, Océ, and Mitsubishi G370-10 printers.

The most important factor in text quality turned out to be the printer's resolution (see Figure 6). Because dithering trades resolution for millions of colors, text is sharpest when printed in one of the

four primaries. As might be expected, the three 300-dpi PostScript printers — Phaser, QMS, and Océ — produced crisp text. High-resolution QuickDraw printers using Freedom of Press printed text of equal caliber, but the 180-dpi PaintJets and Sharp JX-730 showed noticeable jaggies. The 150-dpi Mitsubishi S340-10, with its low resolution and lack of resident fonts, turned in the poorest text performance.

Because it doesn't dither, the S340-10 easily produced the most-even color areas. The Phaser and the Sharp JX-730 were a close second, with the PaintJets and the Shinko and Seiko printers at the bottom of the heap. The S340-10 also produced the smoothest color gradients. The Océ, which did well in some other tests, was at the bottom, along with the Tektronix 4693DX, the only printer that's still stuck in the 8-bit-QuickDraw world (a deficiency that should have been remedied by the time this report is in print).

The first transparency test — for precision and clarity of hairlines — dislodged the S340-10 from the top spot. Here the Phaser was first, followed by the Océ,

Mitsubishi G370-10, QMS, and CalComp printers. The Seiko trailed the pack, along with the PaintJets and the Shinko. But when printing color gradients on transparencies, the S340-10 again regained its lead by a healthy margin over the second-place group, which comprised the Shinko, Seiko, QMS, and Phaser. At the bottom were the Océ, the Tektronix 4693DX, and the ColorQuick.

Overall, the Mitsubishi S340-10 emerged as the clear champ. The Phaser, Mitsubishi G370-10, and QMS also scored well. The ColorQuick finished at



The four inkjet printers (clockwise from top left): Sharp JX-730 Color Ink Jet, Tektronix ColorQuick, Hewlett-Packard PaintJet, and Hewlett-Packard PaintJet XL.



Four thermal-wax-transfer printers (clockwise from top left): Seiko CH-5504, Lasergraphics CPS, CalComp PlotMaster 5902A. and Océ Graphics 5232 CPS Color PS.

Table 2: Features of Color Printers

可能用料	inkjet		l lu	
Mouse rating	Hewlett-Packard PaintJet	Hewlett-Packard PaintJet XL 11112		
Comments	Entry-level print quality. Slow. Limited color range. Separate power supply. All colored inks in one cartridge. Most inexpensive.	Same apparent print quality as PaintJet. Fast. Limited color. One ink cartridge per color. Good paper handling. Prints B size.		
Costs	F-12/51	B011/0-1	Marin .	
List price	\$1,395	\$2,495		
Driver software	included with interface	included with interface	HIII-	
Interface	\$125	\$125		
A-sized paper	200 sheets, \$21	200 sheets, \$21		
A-sized transparencies	50 sheets, \$65	50 sheets, \$65	100	
Ink or ribbon	3-color, \$35; black, \$30	\$30 per color	(1)	
Cost per A-sized print	\$0.11*	\$0.11*	Maria.	
Cost per A-sized transparency	\$0.77*	\$0.77*	The second	
One-year on-site service contract	variable	variable	HE I	
Hardware	E-HE-		DESC	
Maximum resolution (dpi)	180 dpi	180 dpi		
Colors	CMYK	СМҮК	6	
Print-engine manufacturer	HP	HP	35/47	
Hard-disk drive	none	none	22000	
Printer interface	Centronics	Centronics	MARKET	
Mac interface	RS-232 serial	RS-232 serial	STATE OF	
Emulations (other printers)	none	none	WAY.	
B-sized version	PaintJet XL	handles B-sized paper	WELL	
Dimensions (W x D x H [in.])	17.5 x 12 x 4	29.5 x 17.5 x 9	182.65	
Weight (lb)	11 lb	39 lb	F710-14-1	
Software	Maria Ma		200	
Imaging technique	QuickDraw	QuickDraw		
Driver software	PaintJet 2.0	PaintJet 2.0	100	
Driver-software developer	Palomar	Palomar	1911	
Dither patterns	4	4	MSL	
Size of dither cell	8 x 8	8 x 8	G-AS-	
Printable area on A-sized paper	8 x 10.5 in.	8 x 10.5 in.	100	
Fonts	2 resident, 4 outline	2 resident, 4 outline	The second	
Media handling		a recision (realists	OHE OC	
Delivery	Z-fold, sheets	Z-fold, sheets	MATE.	
Sizes	A, A4	A, A3, A4, B	47.4	
Tray capacity	no tray	200 sheets, 70 transparencies	BATTIE .	
Accepts plain paper	yes	yes		
Other	80-31-	25:20 - 1	SVE.	
Warranty period	1 year	1 year		
Manufacturer	Hewlett-Packard Co. 19310 Pruneridge Ave. Cupertino, CA 95014 (800) 752-0900	Hewlett-Packard Co. 19310 Pruneridge Ave. Cupertino, CA 95014 (800) 752-0900		

^{*}Media only; ink use varies according to image.

'A tractor feed (\$290) and cut-sheet feeder (\$790) are optional.

'A new driver with 32-bit support should be available when this report is in print.

'A ribbon for printing transparencies costs \$340 for 100 prints.





inkjet

Sharp JX-730 Color Ink Jet ‡‡‡

Mediocre print quality. Slow. Good color range. Hand-led paper only. Does not print transparencies. Noisy. Shaky. Prints larger than B size.



Tektronix ColorQuick

Vivid colors. Fast. Excellent color range. Highest-dpi inkjet. Hand, roll, and cut-sheet paper feed. Supports TekColor. Noisy, Shaky, Prints B size.



thermal-wax transfer

CalComp PlotMaster 5902A

Mediocre print quality. Slowest by far. Poor color gradients. Low dpi. Optional parallel interface. Plotter emulation. Inexpensive.



Lasergraphics CPS 111

Mediocre print quality. Fast. Low dpi, Includes MacRascol, Same print engine as CalComp with improved RIP.



\$\$ 1/2

Excellent image quality. Compact. No hardware/software interface. Would receive 3.5 mice if interface were included. Inexpensive

Prints larger than B size.	Noisy. Shaky. Prints B size.	Inexpensive.	mar improved tin .	Inexpensive.
\$2,195	\$2,345	\$5,595	\$7,495	ec 005
\$2,195 Paralink, \$125; Hurdler, \$195	\$150	\$5,595	57,495 included	\$5,995
included with driver	included with driver	included with driver	included	none \$695
500 sheets, \$39	500 sheets, \$39			
no transparencies	50 sheets, \$49	500 sheets, \$25	500 sheets, \$20	2,000 sheets, \$110
	The state of the s	100 sheets, \$64	100 sheets, \$48	100 sheets, \$85
2 cartridges, \$12	2 cartridges, \$12	145-print ribbon, \$43	145-print ribbon, \$35	100-print ribbon, \$40
\$0.08*	\$0.08*	\$0.35	\$0.28	\$0.45
no transparencies	\$0.98*	\$0.94	\$0.72	\$1.25
not available	\$214	\$480	\$995	not available
180 dpi	216 dpi	203 dpi (H), 200 dpi (V)	203 dpi (H), 200 dpi (V)	300 dpi
CMYK	CMYK	CMYK	CMY	CMY or CMYK
Sharp	Sharp	CalComp	CalComp	Mitsubishi
none	none	none	none	none
TTL parallel	RS-232 parallel	Centronics	SCSI, Centronics	Centronics
RS-232 serial, NuBus	SCSI	RS-232 serial, NuBus (\$195)	SCSI	none
Tektronix 4695 and 4696	Tektronix 4696	Epson FX-80	HP-GL	none
prints up to 13.6 x 21 in.	handles B-sized paper	none	none	none
25.75 x 14 x 4.75	24.5 x 14.75 x 6	17 x 20 x 12	17 x 20 x 12	17 x 23.25 x 11.25
28.75 lb	26 lb	36 lb	36 lb	57.5 lb
QuickDraw	QuickDraw	QuickDraw	QuickDraw	QuickDraw
Cricket Expressions	ColorQuick	CricketExpression	MacRascol	none
Cricket Software	Tektronix	Cricket Software	Lasergraphics	none
8	1	8	9	driver-dependent
4 x 4, 8 x 8	16 x 16	4 x 4, 8 x 8	4 x 4, 8 x 8	driver-dependent
8 x 10.5 in.	8 x 10.5 in.	8 x 10 in.	7.8 x 10 in.	8.1 x 9 in.
35 outline	none	35 outline	8 outline, 35 optional (\$995)	none
15-16	Marian Transfer	100		
sheets, rolls (paper only) [†]	sheets, rolls	sheets	sheets	sheets
A, B	A, legal, B, 12 x 18 in.	A, A4	A	A, legal
no tray	100 sheets	100 sheets, 40 transparencies	100 sheets, 40 transparencies	100 sheets, 50 transparencies
yes	yes	yes	no	no no
90 days	90 days	90 days	90 days	180 days
Sharp Electronics Corp. Sharp Plaza, Systems Division Mahwah, NJ 07430 (800) 237-4277 (201) 529-9500	Tektronix, Inc. Graphics Printing Division Wilsonville, OR 97070 (800) 835-6100	CalComp 2411 W. LaPalma Ave. Anaheim, CA 92801 (800) 225-2667 (714) 225-2667	Lasergraphics, Inc. 17671 Cowan Ave. Irvine, CA 92714 (714) 727-2651	Mitsubishi Electronics America 991 Knox St. Torrance, CA 90502 (213) 217-5732

the top of the inkjet group and was applauded for the most-brilliant and mostsaturated colors of any printer in the lab. The PaintJets had several low rankings, as did the Shinko.

In a Perfect World . . .

No printer can do everything inexpensively and well. An inkjet can't produce proofs as good as a thermal-wax printer's, but it may print better transparencies. A sublimal-dye printer offers the highest image quality but costs a bundle to buy and operate compared with an inkjet.



The thermal-wax Mitsubishi G370-10 and sublimal-dye-thermal-transfer Mitsubishi \$340-10 (top, left to right) are nearly identical in appearance to the QMS ColorScript 100 Model 10 (bottom).



Three thermal-wax-transfer printers (clockwise from top left): Tektronix Phaser CPS, Tektronix 4693DX Color Image, and Shinko CHC-345.

Table 2: Features of Color Printers, continued

	thermal-wax transfer	
Mouse rating	Océ Graphics 5232 CPS Color PS	QMS ColorScript 100 Model 10
Comments	Plastic ink with good print quality except on transparen- cies. PostScript. Prints on B-sized paper. Expensive. Pantone-certified.	Good print quality. Fast. Excellent software. Simple to install and use. PostScript. Pantone-certified.
Costs	NA CHU	Market All
List price	\$15,990	\$9,995
Driver software	included	included
Interface	included	included
A-sized paper	1,400 sheets, \$135	2,000 sheets, \$125
A-sized transparencies	one 235-sheet roll, \$145	100 sheets, \$125
Ink or ribbon	350-print ribbon, \$159	two 85-print ribbons, \$105
Cost per A-sized print	\$0.78	\$0.68
Cost per A-sized transparency	\$1.28	\$1.87
One-year on-site service contract	\$1,750	\$1,269 - \$1,450
Hardware	HATTON TO THE PARTY OF THE PART	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Maximum resolution (dpi)	300 dpi	300 dpi
Colors	CMY or CMYK	CMYK
Print-engine manufacturer	Sanyo	Mitsubishi
Hard-disk drive	20MB; 80MB (\$1,500)	20MB (\$995), 40MB (\$1,495)
Printer interface	LocalTalk, Centronics	RS-232, RS-422/LocalTalk,
Mac interface	LocalTalk	LocalTalk
Emulations (other printers)	none	HP-GL
B-sized version	handles B-sized paper	Model 30, \$15,995
Dimensions (W x D x H [in.])	24.25 x 20.25 x 13.5	17 x 24.75 x 11.25
Weight	104 lb	65 lb
Software		The state of the s
Imaging technique	PostScript	PostScript
Driver software	LaserWriter 6.0	LaserWriter 6.0
Driver-software developer	Apple Computer	Apple Computer
Dither patterns	-1	1
Size of dither cell	default, 5 x 5; programmable	3-color, 5 x 5; 4-color, 6 x 6
Printable area on A-sized paper	6.8 x 10 in.	8.1 x 9 in.
Fonts	35 resident	35 resident
Media handling		100000000000000000000000000000000000000
Delivery	rolls	sheets
Sizes	A, B	A, legal, A4, special A4
Tray capacity	no tray	100 sheets
Accepts plain paper	no	no
Other	100	Marie San Land
Warranty period	1 year	90 days
Manufacturer	Océ/Schlumberger Graphics 385 Ravendale Mountain View, CA 94043 (800) 537-7568 (415) 964-7900	OMS 1 Magnum Pass Mobile, AL 36618 (800) 631-2692 (205) 633-4300

*Media only; ink use varies according to image

¹A tractor feed (\$290) and cut-sheet feeder (\$790) are optional.
⁵A new driver with 32-bit support should be available when this report is in print.
²A ribbon for printing transparencies costs \$340 for 100 prints.





thermal-wax

Seiko CH-5504 ţţţ

Good color range. Poor line resolution, Slow. Compact. Largest print area. Bundled with Adobe Type Manager, Plus Pack, and Emerald City Type Align.



Shinko CHC-345 111

Excellent image quality. Poor line resolution on transparencies. Slow. Limited color range. Rolled paper difficult to separate. Inexpensive.



Tektronix 4693DX Color Image

Mediocre print quality. Excellent color range. Eight-bit driver.⁵ Optional connection to 4 Macs. Would receive 3.5 mice with improved driver.



Tektronix Phaser CPS \$\$\$\frac{1}{2}

Good print quality. Fast with bundled spooler. Excellent color range. PostScript clone cannot print Adobe Type 1 tonts.



sublimal-dye transfer

Mitsubishi \$340-10 \$\$\$\$

Best print quality. Mediocre color range. Excellent gradients. No hardware/software interface. Would receive 4.5 mice if interface were included.

	and Efficiald Only Type Aligh.	separation mexpensive.	improved driver.	Type I tulis.	interiace were included.
	\$7,000 - \$9,000	\$6,000	\$8.995	\$12.995	\$13,995
	included	\$895	\$495	included	none
	included	included with driver	included with driver	included	none
	four 145-sheet rolls, \$30	one 200-sheet roll, \$14	1,000 sheets, \$53	1,000 sheets, \$53	100 sheets, \$200
	one 120-sheet roll, \$88	one 100-sheet roll, \$57	50 sheets, \$57	50 sheets, \$57	100 sheets, \$220
	four 123-print ribbons, \$245	80-print ribbon, \$48	275-print ribbon, \$115	275-print ribbon, \$115	100-print ribbon, \$280°
	\$0.55	\$0.67	\$0.47	\$0.47	\$4.80
	\$1.17	\$1.17	\$1.56	\$1.56	\$5.60
	\$600 - \$800	\$500	\$855	\$1,223	not available
				BIST 1	Allows III
	300 dpi	300 dpi	300 dpi	300 dpi	150 dpi
_	CMY or CMYK	CMYK	CMYK	CMYK	CMY
	Seiko	Shinko	Sharp	Sharp	Mitsubishi
	none	none	none	40MB	none
	Centronics	Centronics	RS-232 parallel	LocalTalk	Centronics
	-SCSI	NuBus	NuBus	LocalTalk	none
	none	none	optional PostScript, HP-GL	none	none
	QD 5514, \$11,000 - \$13,000	CHC-645, \$9,000 - \$12,000	none	none	none
	14 x 17.5 x 8	16 x 16.25 x 6.5	34.75 x 21.25 x 12.5	34.75 x 21.25 x 12.5	17 x 23.25 x 11.25
	41.75 lb	50 lb	99 lb	139 lb	57.5 lb
	QuickDraw	QuickDraw	QuickDraw	PostScript clone	QuickDraw
	custom driver	ColorOut	4693D/DX	LaserWriter 6.0	none
_	Palomar	GMS	Tektronix	Apple Computer	none
	1	5	1	1	none (continuous tone)
_	8 x 8	variable	16 x 16	variable	none (continuous tone)
	8.25 x 10.7 in	8.7 x 9.5 in.	8.1 x 8.3 in.	8.1 x 8.3 in.	8.1 x 9 in.
-	35 outline	none	none	35 resident	none
	33 Juline	HOUG	HOHO	oo tusidon	Hone
	rolls	rolls	sheets	sheets	sheets
	A, A4, Super A	A	A, legal, A4, special A4	A, legal, A4, special A4	A, legal
-	no tray	no tray	100 sheets, 50 transparencies	100 sheets	30 sheets, 30 transparencies
	no	no	no	no	no
	110	110	110	Track -	
	90 days	user, 90 days; dealer, 180 days	90 days	90 days	180 days
	Seiko Instruments USA, Inc. 1130 Ringwood Court San Jose, CA 95131 (800) 873-4561 (408) 922-5800 (201) 529-9500	Mitsubishi International Corp. 701 Westchester Ave. White Plains, NY (914) 997-4999	Tektronix, Inc. Graphics Printing Division Wilsonville, OR 97070 (800) 835-6100	Tektronix, Inc. Graphics Printing Division Wilsonville, OR 97070 (800) 835-6100	Mitsubishi Electronics America 991 Knox St. Torrance, CA 90502 (213) 217-5732



None can approach the speed of a monochrome laser printer.

In general, inkjets are cheaper than thermal-wax or sublimal-dye printers, and QuickDraws are cheaper than PostScripts. Thermal-wax printers produce richer colors than their inkjet and sublimal-dye counterparts, although a sublimal-dye printer turns out the smoothest color gradients. Software is a critical factor in ease of use, image and text quality, and speed. Serial interfaces are much slower than parallel ones, and LocalTalk connectors allow fast network access.

The five-mouse color printer doesn't exist — yet. When it appears, it may use a technology different from that of any of the printers we tested (see the "On the Horizon" sidebar). Until some new technology corners the market, however, read through "The Bottom Line" to learn which printer is best for your individual needs.

In the '70s, Phillip Robinson was an R&D engineer; in the '80s, he was an author; and in the '90s, he plans to specialize in beach-office telecommunications. MacUser Labs would like to thank Minolta for its loan of spectrophotometric test equipment, and Bob Klein for his assistance in using it. We would also like to thank Rob Tow of Xerox PARC for sharing his knowledge of color theory.

On the Horizon

As good as color printing has become. it's certain to get better. Today's inkjet and thermal-wax printers will continue to evolve, perhaps reaching 600-dpi resolution and certainly running at higher speeds. More sublimal-dye printers are already appearing, with that continuous-tone color printing we like so much (see the "More Color, Anyone?" sidebar). But new technologies - color dry silver, color laser, and Cycolor - are emerging, and they promise even better color images.

Color dry silver is a high-speed, highresolution, dry-process version of the traditional silver halide technology used in photographic film. Honeywell and 3M are jointly testing it for use in medical imaging. CAD/CAM, and business.

Color laser printing is based on the same technology as its monochrome counterpart, except that most color lasers run each page through the entire process four times, each time with toner of a different color. This repetition demands superb registration to assure precise color overlays. Color lasers have been in the news for several years but haven't yet reached the personal-computer market. Kodak's ColorEdge cranks out 17.5 pages per minute, weighs more than a thousand pounds, and costs more than \$100,000. Canon's \$42,500 CLC 500 color laser copier can accept input from video cameras, a computer, or its own flatbed scanner. It prints at 400 dpi and has color-remapping software and its own graphics tablet. Sharp, Xerox, Konica, and Ilford are also in this market, along with a small firm called Colorocs that's working on a one-pass, 300-dpi model.

Cycolor comes from Mead Imaging, A donor ribbon coated with millions of photosensitive cyliths - microencapsulated dye balls - is exposed to light and then pressed against the page. Exposed cyliths squeeze their color onto the page: unexposed cyliths remain dormant. Because the cylith dyes can be mixed in precise proportions and are translucent, Cycolor can create near-photographicquality prints with the shine of offset or sublimal-dye printing. The Cycolor process will probably make a first appearance in color copiers from firms such as Brother and Noritsu.

Phillip Robinson

The Bottom Line

Which is the better team, the San Francisco 49ers or the Oakland A's? Neither, of course — they're both champs. Joe Montana could never hit a high, inside fastball, and Jose Canseco would be instantly sacked by a blitzing linebacker. Picking the best color printer is equally nonsensical - don't ask an inkjet to do the work of a thermalwax printer, and don't expect a thermal-wax printer to produce images as smooth as those from a sublimal-dye printer.

You should know the printer's job description before you head to



the store. Weigh the print quality, color accuracy, and speed you need against the price you can pay. For simple presentations - pie-chart transparencies or red text on a spreadsheet - the right inkjet will do just fine. Inkjets cost between \$1,400 and \$2,500; the least expensive thermal-wax printer, on the other hand, costs nearly \$6,000. Our favorite

inkjet is the Tektronix ColorQuick (\$2,345). It's fast enough for everyday use, has a good range of paper-feed options, and provides the highest resolution of any inkjet we tested. The ColorQuick almost qualifies as the poor man's proofing printer. It has bright, vivid colors, and it supports TekColor, Tektronix's unique screen-to-page color-matching utility.



Proofs and sophisticated presentations call for better quality than an inkjet can provide. For complex drawings and colorful pictures, you'll need a thermal-wax printer. If your pages contain text, you need PostScript, Freedom of Press, or at least a QuickDraw enhancer such as MacRascol. The QMS ColorScript 100 Model 10 (\$9,995)

met with stiff competition, but its unparalleled ease of installation and use helped it edge out the other thermals. The ColorScript is fast, includes PostScript, and consistently scored near the top in our print-quality tests.

For the best possible proofs, you should consider moving up to a sublimal-dye printer. The Mitsubishi \$340-10 (\$13,995) is ex-

pensive to operate and not as easy to set up and use as the ColorScript, but it was the clear winner of the print-quality competition. For proofs, the ColorScript with its speed and PostScript compatibility - may be the more logical choice, but we admit to being seduced by the beautiful output of the Mitsubishi S340-10.



A DRIVE

Infinity Optical...

600MB rewritable cartridge with a 25-year warranty!

Need to store large amounts of data reliably, quickly and safely? Need to move it from computer to computer, city to city? Do you work with graphics, multimedia, databases, sound, scientific data or networks? If you answered yes to any of the above questions, buy an Infinity Optical. Fast, rewritable and economical, it's the best solution for your high-capacity storage needs.



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From Arctic research labs to Australian multimedia studios, PLI is providing infinite storage with 45MB removable cartridges for thousands of computer users. A 20ms access time and high reliability make it ideal as a primary drive, backup device, or means of data transfer and archiving.



IS A DRIVE...

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200 and 250 MB 3.5" drives will unleash your Mac

New standards are being set for high-capacity hard drives, and PLI is setting them. Our 200 and 250MB drives boost your Mac storage capacity and offer a 3.5" form factor with a 100,000 hour MTBF. Like all PLI products, they're very fast, high-performance drives with long-term reliability and are surprisingly affordable.



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PLI's fastest, just got faster...Introducing TurboBoost™ for Near Zero Access Times. This new, proprietary software delivers transfer rates up to 3 times faster than leading drives.

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PLI's TurboWare: (\$436.00 value)

TurboCache...Ram-cache accelerator software

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TurboBack... A fast, icon-based, easy-to-use backup utility

TurboSpool...A quick spooler for laser printers

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The Best of BMUG

Great shareware chosen by a widely-respected user group A.M.E. (a \$279.00 value)

Casady and Greene's security program keeps your data safe!

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All PLI drives include long warranties that are extendable for up to 4 years.

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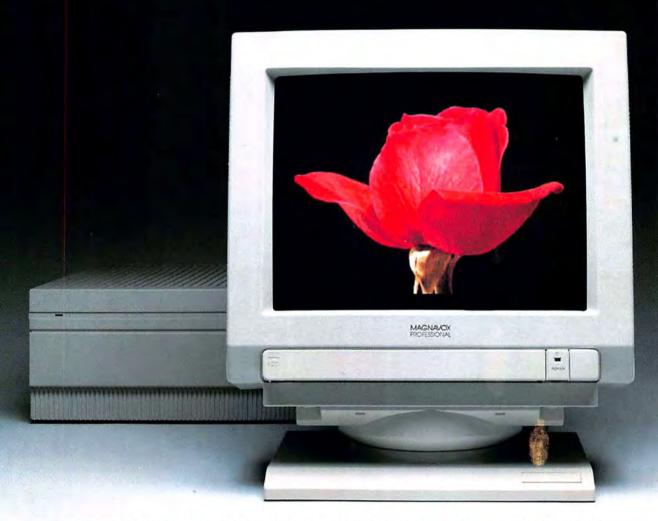
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Introducing A Better Display For The Macintosh II ...

For About \$300.00 Less Than You'd Expect.



This is not just another display clone. It's the new Magnavox Analog Color (MAC) display, specifically designed and engineered to compliment the Macintosh II system.

When we decided to develop a display exclusively for the Macintosh II, we started with two objectives: Make it work better, and make it cost less.

Our 14" MAC display appeals to even the most discriminating user. It's equipped with our new proprietary 0.29mm dot pitch CRT for superb resolution, and a glossy CRT face for crystal clear images. Graphics and text on the MAC display shine at their best. The integrated tilt-base provides the ultimate in user comfort.

Additionally we offer a solid, two-year warranty instead of the usual 90 days. And the \$699 retail makes this a great value.

Designing a superior display for the Macintosh II system was smart. Offering it for \$300 less, that's very smart.

MAGNAVOX Smart. Very smart.

Reader Survey

Give us

100 words,

and you

might win

a million.

(Words, that is.)

We need your help. We'd like to know what's on your mind. What issues and technologies will shape the 1990s? Is multimedia for real? What about Windows? What do you think Apple is doing right, and what could it do better? And what's *MacUser* doing right — and what changes would you like to see?

The following survey will help us gauge the issues that you — our readers — are most concerned with. Your answers will help us provide the Macintosh coverage you need. We'll also report our findings from the survey in a future issue of *MacUser* and pass your comments on to Apple Computer — so this is also your chance to be heard by the folks in Cupertino. To

stand up and be counted, just photocopy the survey and return it to us by June 30, 1990.

Hey, we know how easy it is to forget to send back those magazine sweepstakes forms to Ed McMahon, and we wouldn't dream of asking you to do something for nothing. So thanks to the generosity of Microsoft Press, ten lucky winners, randomly selected from all responses, will receive a complete library of ten Macintosh books. They include the new edition of Ted Nelson's Computer Lib/ Dream Machines, the irreverent classic that - more than a quarter century ago pointed the fledgling computer industry toward concepts and problems that

are still unfolding; The Big Chip by W. R. Philbrick and Bruce Jensen, the world's first "technographic" novel; and eight other books that will boost your productivity in word processing, spreadsheeting, desktop publishing, and more.

It's an instant Mac library worth more than \$200, containing well over a million words. And it's our way of saying "Thanks a million" for sending your survey in. Send your responses to *MacUser* Reader Survey, 950 Tower Lane, 18th Floor, Foster City, CA 94404, by June 30, 1990.

This survey contains three groups of questions about Macintosh products and companies, how you use your own Mac, and how you feel about *MacUser*.

About the Macintosh Support and Service

Prices, features, and benchmarks tell only part of the story. For each of the following product categories, note whether or not you use a product in that category and, if you do, name the company that you feel provides the best after-sale support:

Ten winners will each receive all the following books, courtesy of Microsoft Press: The Apple Macintosh Book by Cary Lu The Big Chia by W. R. Philhrick and Bruce Jensen Computer Lib/Bream Machines by Ted Nelson Desktop Publishing by Design by Ronnie Shushan and Don Wright Excel in Business by The Cobb Group Inside SugerCard by Andrew Himes and Craig Ragland Learning with Interactive Multimedia edited by Sueann Ambron and Kristina Hooper Micresoft Works for the Apple Macintosh by Charles Rubin PowerPaint Presentations by Design by Roger C. Parker Working with Word by Chris Kinata and Gordon McComb

(Employees of Ziff-Davis Publishing Company and Microsoft Press and their relatives are not eligible to win.)

	Use	Don't Use	Company That Provides Best Support
Business Software	1	Duit Cost	company that Provides best support
Accounting	0	0	
Database	0	0	
Integrated software	0	0	
Personal finance	0	0	
Project management	0	0	
Spreadsheet	0	0	
Word processor	0	0	
Word processor add-on	0	0	
DTP Software			
Charting	0	0	
Drawing	0	0	
DTP utility	0	0	
Page layout	0	0	
Painting	0	0	
Typography	0	0	

Reader Survey

Support and Service

Prices, features, and benchmarks tell only part of the story. For each of the following product categories, note whether or not you use a product in that category and, if you do, name the company that you feel provides the best after-sale support:

	Use	Don't Use	Company That Provides Best Support
Technical Software			
Al/Expert system	0	0	A STATE OF THE STA
CAD	0	0	
Network management	0	0	
Programming tool	0	C	
Simulation/Statistical analysis	0	0	The state of the s
Telecommunication	0	0	
Other Software			
Entertainment	0	0	
Multimedia	0	0	
Music	0	0	
Presentation	0	0	
Stackware	0	0	
Utility	0	0	
Other software	0	0	
Output Hardware			
Laser printer	0	0	
Monitors/display system	0	0	
Nonlaser printer	0	0	
Input Hardware			
Graphics tablet	0	0	The state of the s
Keyboard	0	0	
Mouse	0	0	
Scanner	0	0	
Storage Media			
CD-ROM drive	0	0	
Erasable-optical drive	0	0	
Hard-disk drive	0	0	
Removable medium	0	0	
Communications Hardware			
Fax modem	0	0	
LAN	0	0	
Mac-to-mainframe hardware	0	0	
Mac-to-PC hardware	0	0	
Modem	0	0	(
Networking board	0	0	
Miscellaneous Hardware			
Accelerator board	0	0	
Accessory	0	0	-

Product Design

Have you ever found yourself feeling that a great hardware or software product is missing one little feature that would make your life a lot easier — but nobody seems to have thought of it? If you've got a wish list of features that are missing from any of these product categories, write them in:

The feature(s) I'd like to be added would do the following:

Business Software	
Accounting	
Database	
Integrated software	
Personal finance	
Project management	
Spreadsheet	
Word processor	
Word processor add-on	
DTP Software	
Charting	
Clip art	
Drawing	
DTP utility	
Page layout	
Painting	
Technical Software	
AI/Expert system	
CAD	
Network management	
Programming tool	
Simulation/Statistical analysis	
Telecommunication	
Other	
Entertainment	
Multimedia	
Music	
Presentation	
Stackware	
Utility	
Other	

Reader Survey

Future Shock

The Mac marketplace is full of buzzwords. Which of the following emerging applications and technologies are passing fads, and which are The Next Big Thing(s)?

	Never Heard of it	Just a Fad	Not Real Yet	Need More Information	Will Make a Real Difference
Issues and Trends	1.75				
A/UX	0	0	0	0	0
Color applications	0	0	0	0	0
Connectivity	0	0	0	0	0
Desktop presentations	0	0	0	0	0
Font wars	0	0	0	0	0
>300-dpi output	0	0	0	0	0
Groupware	0	0	0	0	0
Hypertext	0	0	0	0	0
Laptops	0	0	0	0	0
Mac-based workstations	0	0	0	0	0
Mac/PC detente	0	0	0	0	0
Multimedia	0	0	0	0	0
PostScript clones	0	0	0	0	0
Prepress applications	0	0	0	0	0
System 7	0	0	0	0	0
Windows	0	0	0	0	0
Technologies					
CD-ROM	0	0	0	0	0
Read/write optical storage	0	0	0	0	0
RISC	0	0	0	0	0
NeXT	0	0	0	0	0

If I Ran Apple. . .

Like all multibillion-dollar companies, Apple has to balance all the different concerns of its diverse customers (as well as its stockholders). If you were appointed CEO of Apple Computer, how concerned would you be about the following consumer criticisms? (Feel free to write in your solutions.)

•	Not a Big Deal	Serious Problem	Hopeless	Solution
Choices getting too complex	0	0	0	
Competition from NeXT	0	0	0	
Competition from OS/2	0	0	0	
Competition from Windows	0	0	0	
Dealer-network problems	0	0	0	
Dueling font standards	0	0	0	

	Not a Big Deal	Serious Problem	Hopeless	Solution	
Dueling PostScript clones	0	0	0		
Excess of CPU choices	0	0	0	1	
High CPU prices	0	0	0		
High peripheral prices	0	0	0		
Inadequate warranties	0	0	0		
Lack of CPU choices	0	0	0		
Lack of technological innovation	0	0	0		
Obsolete System software	0	0	0	/	
Slowness of CPUs	0	0	0		
Third-party-software conflicts	0	0	0	(<u> </u>	
■ Do you consider yourself a: ○ Novice ○ Power user	○ Hacker/developer○ Guru			(check all that apply): Apollo Apple II family Mainframe Silicon Graphics Sun VAX	
■I use my Mac ○ at home ○	at work	Oboth		○ NeXT ○ Other CPU: ○ PC-compatible ○ Other CPU:	
■I use my Mac about ho	ours in ar	average	week.	■The Mac I use most often is a (check one):	
■ How many people do you personally assist or advise in: Mac product selection Mac product troubleshooting Mac product training				○ Mac Plus ○ Mac IIcx ○ Mac SE ○ Mac IIci ○ Mac SE/30 ○ Mac Portable ○ Mac II ○ Other Mac ○ Mac IIx specify:	
■Is your Mac part of a network?				■The Mac I use most often has megabytes of	
Yes No Don't know If "Yes," which of these do you use on your network:			memory, amegabyte hard-disk drive, and a color/monochrome/gray-scale (circle one) display system		
Color printer	C Laser	•	oin.	And the second s	
○ E-mail	O Mode			■ Do you belong to a Mac user group?	
○ Fax modem		user datab	ase	○ Yes	
○ File server		ser printe		○ No	
	OPlotte				
Remote-access software					

Reader Survey

About *MacUser*

	Not Useful	Somewhat Usef	ul Mar	Mandatory	
Annual Eddy awards	0	0	0		
Capsule reviews	0000000	0	0		
Feature-comparison tables		0	0		
Graphics		0	0		
In-depth evaluations			0		
Lab benchmarks			0 0		
MiniFinders		0			
Mouse ratings		0			
"On the Horizon" sidebars		0			
"The Bottom Line" summaries	0	0	0		
What sections of <i>MacUser</i> do y	ou like best? Read it first	Always read it	Sometimes	Never	
Advertisements	0	0	0	0	
Beating the System	0	0	0	0	
Bridges	0	0	0	0	
0				0	
	0	~	Q	0	
Columns (especially		0	O	0	
Columns (especially DTP	_) 0	0	0	~	
Columns (especially DTP Features	0	0	0000	0	
Columns (especially DTP Features Help Folder	0	0 0 0	00000	0	
Columns (especially DTP Features Help Folder Lab reports	0 0 0	0 0 0	00000	0	
Columns (especially DTP Features Help Folder Lab reports Letters	0	0 0 0 0 0	0000000	0	
Columns (especially DTP Features Help Folder Lab reports Letters MiniFinders	0 0 0	0 0 0 0 0 0	00000000	0	
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Columns (especially DTP Features Help Folder Lab reports Letters MiniFinders News Power Programming Power Tools	0 0 0	000000000000000000000000000000000000000	000000000000000000000000000000000000000	0	
Columns (especially DTP Features Help Folder Lab reports Letters MiniFinders News Power Programming Power Tools Reviews	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	000000000000000000000000000000000000000	000000000000000000000000000000000000000	00000000	
Columns (especially DTP Features Help Folder Lab reports Letters MiniFinders News Power Programming Power Tools Reviews Special reports	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	000000000000000000000000000000000000000	000000000000000000000000000000000000000	00000000	
Case studies Columns (especially	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	000000000000	000000000000000000000000000000000000000	00000000	
Columns (especially DTP Features Help Folder Lab reports Letters MiniFinders News Power Programming Power Tools Reviews Special reports		00000000000	0000000000000	00000000	

Send your responses to MacUser Reader Survey, 950 Tower Lane, 18th Floor, Foster City, CA 94404, by June 30, 1990.

(You may respond anonymously, but you will not be included in the drawing for the Microsoft Press Mac library.)

Your responses will be treated confidentially. If you don't mind being quoted in print for a future MacUser summary of these findings, please check the box below and sign and date this form.

() You may quote me in MacUser's summary of this survey.



Now you can travel from here to there with twice the horsepower.

Getting from your Macintosh to virtually any fax machine in the world is now a lot faster.

Because the new 9600-bps Abaton InterFax 24/96 gets your message across twice as fast as before. And since the InterFax software compresses the file before sending it out, you spend even less time faxing than with any other 9600-bps fax/modem.

But we didn't just double the raw output speed, we made it easier to use. We included direct scan support, so you can fax art and photos straight from the scanner with excellent resolution. We also made the software easier to use — it's as simple as printing to any printer. And we made the InterFax work in background (with or without Multifinder), so you can get back

Abatus, InterFax, and "We Make Your Ideas Easier to Publish" are trademarks of Everex Systems, Inc. Other brand names and product names are trade marks or resistered trademarks of their respective companies. Abatus, a subsidiary of Everex Systems, Inc. 48431 Milmont Drive, Fremont, CA 98536 to work while your Mac faxes. You can even schedule when faxes are sent to take advantage of lower phone rates.

As an added plus, the new InterFax also works as a 2400-bps Hayes-compatible data modem with MNP 5 error correction. All these features together made *MacUser* name the InterFax 24/96 the best communication product of 1989.

If you want to get from here to wherever with twice the horsepower, call Abaton at *1-800-444-5321*, or fax a note and your business card to *(415) 683-2956*. The new InterFax 24/96 will make your ideas easier to publish. Anywhere.



Introducing the Interfax 24/96

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INTRODUCING WIZ is an exciting new productivity tool. It combines the easy-to-use features of a mouse with the power of an intelligent graphics pad to enhance every pointing, tracing and drawing function you do. And it gives most Mac and PC users a short cut through tedious keystrokes and menu picking steps. So it's easier for new computer users to learn both the system and the software. While experienced users immediately become more productive, powerful and creative. But the most amazing thing about WIZ is that you get it all for a suggested retail price of under \$250. Features/Benefits 6 programmable functions. The three WIZ mouse rocker buttons allow you the flexibility and convenience to program up to four different commands or macros. Two others control your mouse and template clicks. Speed. WIZ eliminates the need for scrolling through multiple on-screen menus or

remembering the many keyboard commands used by software packages. Programmable buttons and templates allow instant access to commonly used software commands. **Pinpoint accuracy.** WIZ is the most accurate mouse system on the market, with 1000 dots per inch (dpi) resolution, compared to as much as 400 dpi offered by other mouse manufacturers. The very high accuracy of the pad, combined with the cross-



hairs on the mouse and the optional pen, make WIZ excellent for drawing and tracing. **Reliable.** WIZ has no mechanical parts. It is all electronic, so there are no parts to clean or maintain. No rolling ball or moving parts on the mouse. WIZ is the most reliable system you can get.

Adjustable pad scaling. WIZ allows you to define the portion of your intelligent pad's active area which corresponds to your computer screen. This is especially beneficial in drawing and tracing applications.

Templates offer direct access to commands. Optional templates, available for most major programs, fit on top of your intelligent pad. The color-coded WIZ templates place software commands at your fingertips, eliminating tedious pull-down menus and keystrokes.

Software compatibility. Works with most of the popular mouse-driven software. Full Microsoft and Apple mouse compatibility. **Small footprint.** It's the same size as an ordinary mouse and pad. 7.5" square active area. The overall size is 9.5" x 11.8".

Easy to install. Works on IBM and compatibles plus Macintosh II and SE computers. WIZ plugs right into your mouse, serial port or ADB, (depending on your system). You're up and running in just a few minutes.

Complete system. WIZ comes complete with a WIZ mouse and intelligent pad, interface cables, drivers, operating system template, User's Guide and a 5-year warranty. **Support.** WIZ is manufactured by CalComp, a world leader in computer graphics for over 30 years.

Who can use WIZ?

Anyone who is now using a mouse or thinking about using one including: Business professionals can use WIZ with all their applications to help save time when creating presentations and business forms, including spreadsheets and graphics. Graphic artists can use WIZ to assist with the creation of simple to sophisticated designs and graphics.

Electronic publishers, both professional and occasional, can use WIZ to help speed the creation of a variety of professional-looking documents such as newsletters, flyers, pamphlets and stationery.

Engineers and architects can use WIZ as a CAD tool for conceptual designs and technical drawings.

Writers and journalists can use WIZ to assist in the creation of articles, manuscripts or stories.

Options

WIZ Pen

selections.

Creative alternative. When you prefer the feel of a pen over a mouse. It's great for menu-picking, drawing and tracing, as well as controlling screen cursor movements. Plugs right into the back of your pad.

2 Buttons. Use the button in the tip to menu pick, draw and trace—can use for all your mouse functions too. The side button allows you to make template command

Suggested retail price of \$75



WIZ Software Application Templates

Enhance productivity. When you want speed and power, use the WIZ mouse or pen and intelligent pad with a template. WIZ comes with a standard template for your computer's operating system. Plus there's a variety of optional templates for the most popular software packages, which makes using packages quick and easy.

Easy to use. The color-coded templates come complete with easy to install software and instructions.

Templates

Over 35 optional software templates are available for most IBM and Apple packages, including:

Aldus PageMaker WordPerfect Harvard Graphics Microsoft Excel Claris MacDraw II

Availability and Support:

See WIZ today at your local computer store or dealer.

If your dealer doesn't have WIZ in stock, he can order it through our distributor Ingram Micro D by calling **800-456-8000**.

For product information on WIZ call CalComp at 800-458-5888.

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By CalComp

Everything else is just a mouse!

POWER TOOLS

EDITED BY James Bradbury

The Mac pioneered acceptance of a graphical user interface, but people forget that from the very beginning there's been sound to go along with those pictures.

Sound Advice

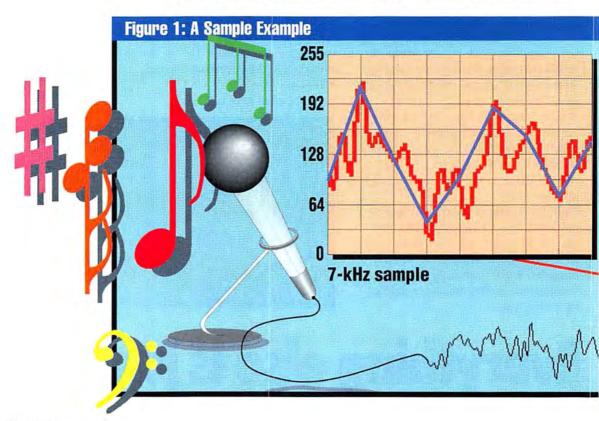
ver since the Mac II debuted with a choice of beep sounds, average users have been incorporating sound into their systems. Hyper-Card scripters, in particular, have added sound effects to everything — from Cosmic Osmo to training stacks.

The importance of sound for the future has not gone unnoticed. Apple has developed a device-independent AIFF (Audio Interchange File Format), which should see a lot of use in the future. System 7 is also rumored to have big changes in sound management.

But there's no need to wait for these projected developments any longer. You can start working with sound now, using inexpensive hardware and software, and achieve results that would have been the exclusive domain of professional sound designers just a few short years ago. Whether you want to enhance a Hyper-Card training stack or just add a little pizzazz to your own Mac, sound is one area in which a small investment in time and money can pay big dividends.

What You Need to Know

When you work with graphics on the Mac, your data is in the form of pictures. When you work with sound, your data is in the form of samples. A sample is simply a digitized representation of a sound, much as a movie is a sequence of individual pictures that create the illusion of motion. Similarly, a sample is made by taking many different audio "snapshots" and stringing them together. It's the same basic process used in digital recording and mastering to create compact discs. Figure 1 shows how a sound is translated





into sampled numeric data that the Mac understands.

As with motion pictures, the more snapshots you take, the more information you capture, and the more realistic the end result. The sampling rate is expressed in kilohertz, which means thousands of cycles per second. A 22-kilohertz sample, then, is recorded at 22,000 cycles per second. The more cycles per second, the more realistic the sound. And the higher the sampling rate, the more data you have, which means bigger files.

Figure 2 shows the trade-off between fidelity and file size that you can expect at different Mac sampling rates. For technical reasons, you always have to sample a sound at a rate equal to at least twice the highest frequency that you want to play back. Thus, a 22-kilohertz sample (which is the best a Mac can do without the addition of extra hardware such as Digidesign's Audiomedia board for the Macintosh II family) translates to about 11 kilohertz as heard by the human ear. (The upper limit of human hearing is around 20 kilohertz.) When you record samples

at a lower kilohertz setting, you lose the high-frequency subtleties of the sound — the stuff that distinguishes hi-fi from medium-fi.

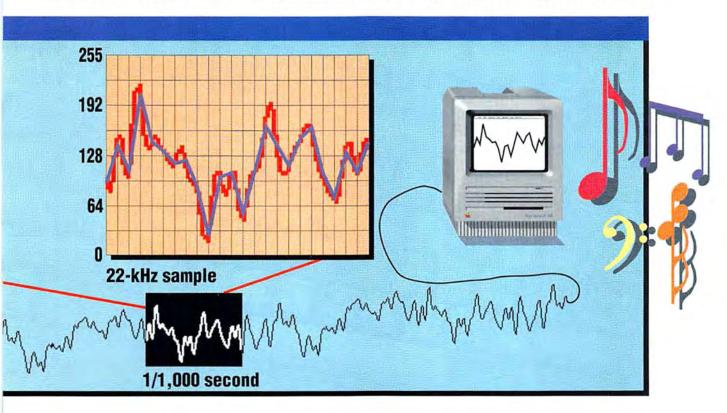
Sampled sound on the Mac shares something else with graphics: a number of different and sometimes incompatible formats. You should know about the following three types: standard snd resources, which are what Mac users with System 6 use to turn their beep into monkey's chatter or a clink-clank; Hyper-Card snd resources, which are in a different format than System snd resources and must be converted before they'll work; and finally, sound captured as data instead of as a resource. The latter format is the one Farallon Computing's SoundEdit program uses automatically to save sounds, although it can also save them as resources. Because the most popular shareware program for handling such data files is Bruce Tomlin's SoundMaster, we'll refer to them as SoundMaster files.

You can standardize the format of sound files by converting from one type to another. Table 1 shows what you need to perform conversions. The table is based on information from a HyperCard stack by Bob Caceres of The Boston Computer Society. This stack is part of a complete Sound Utils package that also includes copies of all the shareware programs you need to work with sound. See the "Shareware Resources" sidebar to find out where to get individual utilities or the entire package.

Sound Devices

If you want to edit sounds or capture your own, the place to start is with Farallon Computing's MacRecorder and its accompanying software (see "StartUp" January '90 for a review). Because MacRecorder uses your Mac's available memory for sampling, you'll want 2 or more megabytes of RAM. It might get tight with only 1 megabyte — samples must fit into memory to play. The amount of memory you have determines the maximum length of time you can record

By Craig O'Donnell



105 KEYS TO A MO

When you design and build over 14 million personal computer keyboards, you learn a thing or two about productivity.

At Key Tronic®, we've put everything we learned during 20 years as the world's leading keyboard manufacturer into our all-new 105-key MacPro™ extended keyboard.

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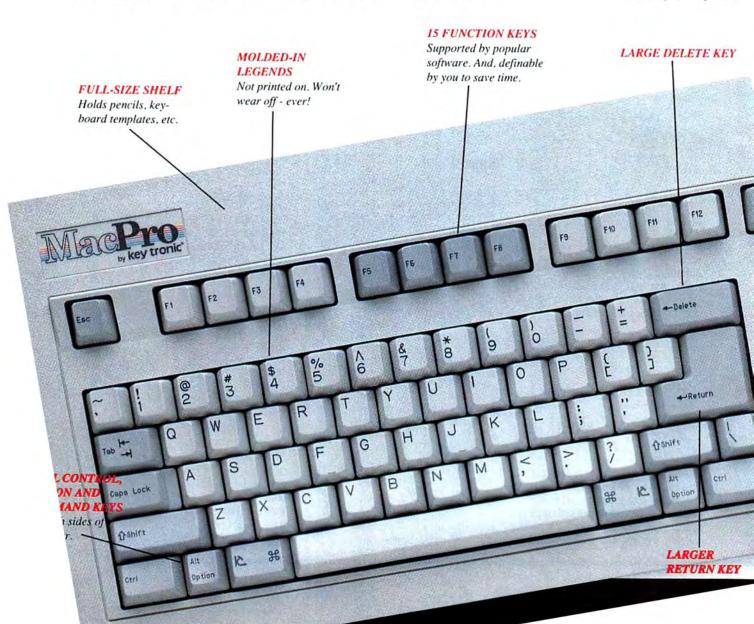
Like a full row of function keys, separacursor control keys, and LED

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But MacPro also gives you a lot of features Apple doesn't. All of which can reduce keystrokes, and the time it takes you to execute them.

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world's finest keyboard



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Including an enhanced, lower-profile gonomic design. And an enlarged L-shaped eturn kev.

You get a positive, tactile feel that omotes faster, more accurate data entry. nd capacitance switch technology that elivers 100-million-keystroke reliability –

5

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a lot more fun.

turn, enables us to back MacPro with an unsurpassed three-year limited warranty. All for

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sional Series

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Tempo II™ makes it easy to assign keystrokes, commands, mouse movement sequences and button clicks to the Function keys. It's included free with your new MacPro.

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MAC II POWER ON SWITCH WITH LED

NUMERIC KEYPAD

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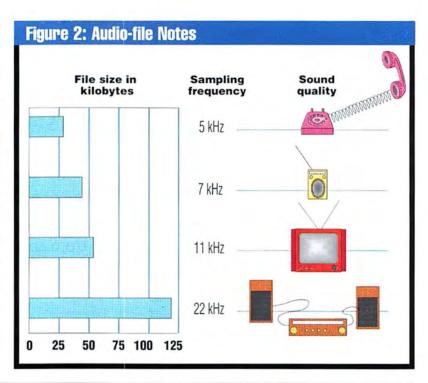
any one sound; when you run out of RAM, your time's up. So be sure to boot with MultiFinder off.

A hard disk helps too. A 20-second sample that was recorded at 22 kilohertz will eat up 400K of disk space. That's why HyperCard stacks containing sound resources grow big so quickly.

Finally, use HyperCard 1.2.1 or later for stacks that feature sound. Version 1.0 is notorious for crashing during sample playback.

The MacRecorder consists of three parts: the sampler proper, which is a mouse-sized digitizer with a built-in microphone plus inputs for external sources; the SoundEdit application for sophisticated sample editing; and two stacks, HyperSound and HyperSound ToolKit, for creating and manipulating samples in HyperCard.

SoundEdit's interface beats that of many professional sound applications, and it's intuitive enough that you can get started without reading the manual first. But the documentation is so good you



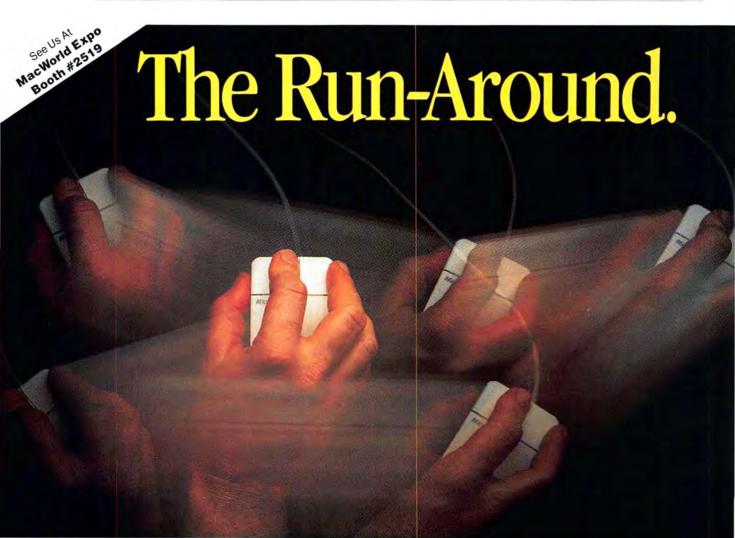




Table 1: Moving Sou	nds from Ear to There		
	Convert from snd (HyperCard resource)	Convert from snd (System resource)	Convert from data (SoundMaster)
to snd (HyperCard resource)	use ResCopy XCMD, Apple's HyperCard utility that simulates Font/DA mover	use ResCopy XCMD	use Sound ->snd
to snd (System resource)	use Sound Mover	use Sound Mover	use Sound ->snd
to data (SoundMaster)	use Sound Leech		no conversion necessary — jus move the sound files in and out of your folder with the Finder

^{*} Although no public-domain software can perform this conversion, you can convert the System snd to a HyperCard snd and copy it to a HyperCard stack. Then convert the newly created HyperCard snd resource to a SoundMaster-compatible sound file.

Table based on Bob Caceres' Sound Utils stack.

could use it to make SoundEdit an excellent learning lab.

SoundEdit handles both sound data files and snd resources. The graphic waveform display conveys a lot of information, and you'll soon learn to recognize the beginnings and endings of syllables, drumbeats, and other reference points.

Each sample may be played in full or

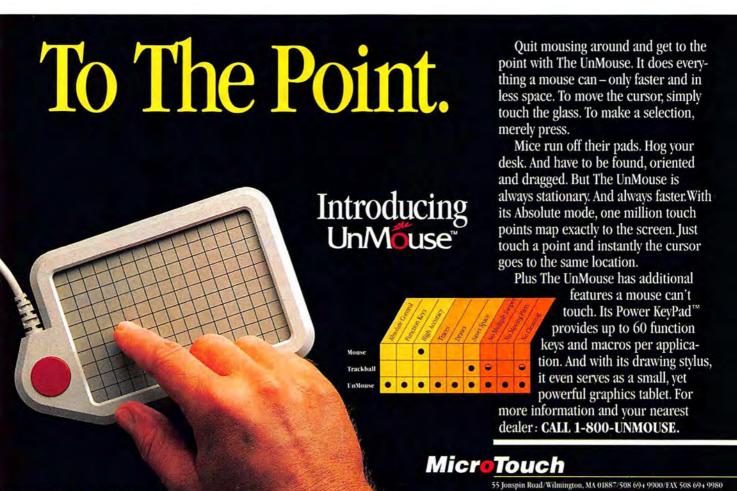
in part, and the standard Macintosh click-drag and Cut, Copy, and Paste editing lets you manipulate pieces of sound. The Effects menu contains a long list of sonic modifiers such as echo, backwards, and bender. Some are useful and others are useless, but all are easy to try. And they're all undoable. (For more about SoundEdit's effects, see "Can We Talk?" June '88).

Other Hardware

MacRecorder comes with an internal microphone, but it's nothing to write home about. You can dramatically improve the quality of your own live sampling if you invest in a better microphone and plug it into the Mic jack on the MacRecorder.

By the same token, the Macintosh's internal speaker doesn't even rate a

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Tips for Great Sound

As you work, use a reference monitor so you hear exactly the same nuances that the members of your audience will. In other words, if they're going to hear your work on the Mac's internal speaker, use the Mac's speaker as you sample and edit. Never make final decisions on output based on listening to speakers that are better than those your audience will hear.

Using the best audio source you can, match the sampling rate to the sound's overall quality; otherwise you're wasting disk space and risking creating unintellicible sound.

Always start samples cleanly. Delete dead air. In a 22-kilohertz sample, a half second of silence uses as much space as a half second of music: 11K. A good rule of thumb: When you look at the beginning of your sample under high magnification, the wiggly waveform should be at zero. If it isn't, you'll hear a click.

If there's a click or pop in the middle of a sample (such as when you're sampling from a scratched record), you can usually isolate it by selecting and listening until you can position your cursor a tiny bit ahead of the click on the waveform. The click

will look like a spike — select and delete it.
Your sounds will seem much more natural ral if they don't begin or end with a click.
To avoid clicks, choose a little bit of the end of the sound, and fade to zero with the Envelope; fade from zero at the beginning of a sound.

The Sounds of Music

If you're recording music, stick with either 11 kilohertz or 22 kilohertz. (If the source is the absolute pits — a cassette recording of a phone call, for instance — 7 kilohertz is OK.) Any tonality lost at 11 kilohertz is repaid in disk space, because your files will be smaller. Keep in mind that the tonal balance of an 11-kilohertz sample best matches the internal speaker's tone.

When the sampling rate is too low and the sound you're recording contains a lot of treble, a peculiarly digital distortion called aliasing can occur. It sounds like a lot of crystal chimes and musical saws making noise far away as the sample plays. At the 5- and 7-kilohertz rates, sampling music often leads this kind of distortion. To avoid it, sample at 22 kilohertz and employ file compression, a SoundEdit option that lets you reduce the amount of disk space used to store a sound

while experiencing only a slight loss in audio fidelity.

If you're using a prerecorded source, don't record with a microphone. Always connect your music source to the Line jack on the MacRecorder; this is called "going direct," and the results are well worth it. All you need to make the connection is a patch cord with the right plugs on either end.

Hearing Voices

Voices vary incredibly in timbre and pitch. The best approach? Make a master 22-kilohertz sample, and then downsample to 11-kilohertz and 7-kilohertz files (down-sampling is when you take a sample recorded at one frequency and use SoundEdit's Mixer option to convert it to a lower frequency). Then see which is most acceptable.

If you can tape a voice before you tape the rest of your sounds, do so. If not, have the speaker enunciate slowly and loudly, without shouting, keeping the microphone three to six inches from the mouth. Do as many takes as you need to get it right, because you might not be able to fix it later.

black-and-white postcard. Using a miniamplifier and speakers makes a world of difference.

You can get very good results from tools available at your local Radio Shack. Here are some useful items from the 1990 catalog:

Microphone: PZM (33-1090), \$49.95. Amplifier: Stereo Micro Amplifier (31-1982), \$29.95 — remember that the Mac's speaker-output jack is powerful enough only for miniheadphones; so connect the Mac speaker-output jack to the MacRecorder Line jack.

Minispeakers: Minimus 0.3 (40-1250), \$14.95 each — the speakers are a particularly good match for the Micro Amplifier in that they're tiny and match Mac Plus and SE output tone well.

Speakers: Minimus-7 (40-2030/40-2045), \$49.95 each — good full-range two-way minispeaker.

Amplified speakers: (40-166), \$19.95 per pair — 2-watt, battery-powered speakers.

For a slightly heftier investment, "satellite" speaker systems (such as the \$499 Cambridge SoundWorks Ensemble) combine inobtrusively placed woofer (bass) units with small high-frequency speakers.

Shareware Resources

Even without MacRecorder and SoundEdit, you can get your Mac to sound off. The nation's private bulletin boards, on-line services, and user-group disk libraries can provide you access to a zillion bytes of sound bites from TV, movies, and songs.

Once you've got some sounds, you can take advantage of the wealth of sound-utility programs available as shareware. The easiest way to collect them all is to obtain Bob Caceres' Sound Materials package, which includes his own Sound Utils stack, copies of the five shareware programs listed below, and several samples. You can get a copy through MacUser's on-line service (log on to CompuServe and type GO MACUSER) or by mail through BCS-Mac (48 Grove St., Somerville, MA; 02144 [617] 625-7080). Boston Computer Society members, \$4; others, \$10; add \$3 postage and handling to each order. Bob's stack is free; he just asks that you pay your shareware fees to Riccardo and Bruce, the other shareware developers represented in the Sound Materials package.

ResCopy XCMD, an Apple utility written by Steve Maller, is not part of the Sound Utils package but is available from most online services. Sound Leech: Converts and resources to SoundMaster format.

Robert S. Mason, Jr. 157 Sutton Road Lebanon, NJ 08833 Shareware

SoundMaster: A cdev that lets you assign sounds to system events such as Restart, Beep, and Shut Down.

Bruce Tomlin 15801 Chase Hill Blvd., #109 San Antonio, TX 78256 Shareware, \$10

Sound Mover: Moves and resources to and from files. Designed to look and work like Font/DA Mover; and

Sound->snd 1.2e: Converts Sound-Master-type files to snd resources.

Riccardo Ettore 67 Rue de la Limite 1970 W-Oppem Belgium Shareware, \$20

SuperPlay 4.0: Plays snd resources at various sampling speeds. Can play every resource in a specified folder.

John Raymonds 21738 Barbara St. Torrance, CA 90503 Shareware



Carbon Copy Mac is a remote control software package for the Macintosh. It allows one Mac to remotely access and operate another Mac's peripherals, screen, keyboard, and mouse. Carbon Copy by Microcom Software . \$119.00



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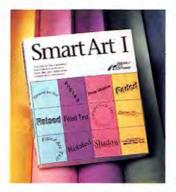
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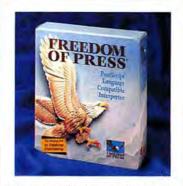
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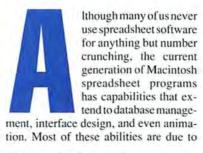
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Using Macros for Full Impact

Need to create letters from spreadsheet data? Here's a mailmerge macro that prints form letters from a Full Impact database.



By John Rizzo

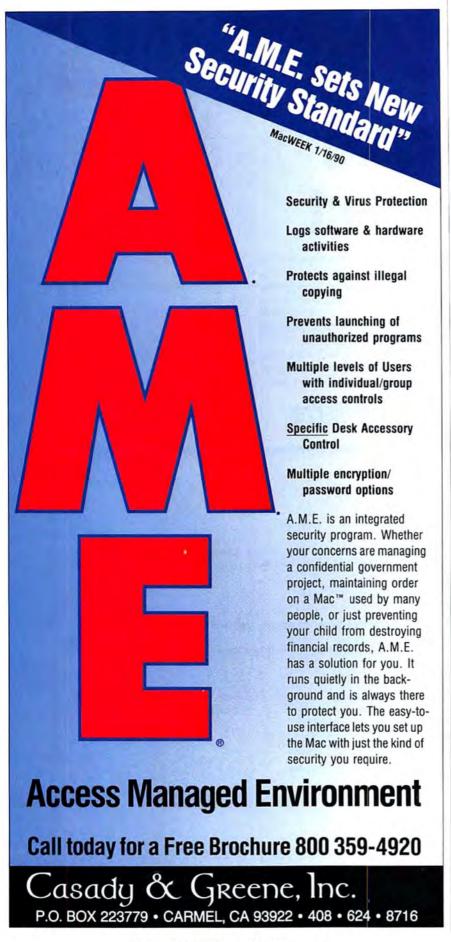
macro languages, which began as math functions and evolved into programming languages that do far more than play back keystrokes.

Wingz gets a lot of attention for its flashy 3-D graphics, but Ashton-Tate's Full Impact also has a lot to recommend it—for instance, it has a powerful macro language called FullTalk. With it, you can create new features or even applications that go far beyond adding up tables of numbers.

One of FullTalk's features, introduced

```
Figure 1
  Macro
   Define which row database starts at.
  Current Row := 2
  ; Create the named ranges for text substitution. Use your own field names.
    Cell number is the first cell in each field column.
  Add range ("Name", A2)
  Add range ("Number Macs", B2)
  Add range ("Number PC", C2)
  ; Print form letters for all rows until the current cell in column A is
  ; The 1 refers to column A but can be changed to any column in your data-
  base.
  While ~Isnull(Cell(1, Current Row))
       ; Modify the named range to correspond to the same column,
       ; but reflect the correct row. Numbers 1, 2, & 3 refer to columns.
       Modify_range("Name",,Cell(1,Current_Row))
Modify_range("Number_Macs",,Cell(2,Current_Row))
Modify_range("Number_PC",,Cell(3,Current_Row))
       ; Print the form letter
       Print_one (1, 1, 1, 1)
       ; Next row (if any)
       Current Row := Current Row + 1
  ; Clean up when done
  Remove_range("Name")
Remove_range("Number_Macs")
  Remove range ("Number PC")
```

Figure 1: This short FullTalk macro turns the spreadsheet program Full Impact into a simple mailing-list manager.



Please circle 104 on reader service card.



3 0 0	lame indrey Hiters of Spring oth Calamers Inn Rove	Number Place 8 10	Number PCs 10 0			
	ath Spring able Calamera	10	10	-	-	_
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Figure 2: Full Impact's FullTalk macro language enables you to take this form letter and print a copy for each selected record in your database.

with version 1.1 of the program, is the ability to use extensions called XMacros. Like HyperCard's XCMDs, Full Impact's XMacros make calls to code written in other languages, such as C, or even to sound resources. You can download XMacro libraries and applications from the Ashton-Tate Forum on CompuServe or from the company's own BBS ([213] 538-6196, 1,200 bps; [213] 324-2188, 2,400 bps).

This macro generates form letters.

But even without XMacros, FullTalk macros let you add functionality to your software. Here's an example of what even a simple FullTalk macro can do. With just a dozen lines of code, this mailmerge macro by Dylan Ashe of AshtonTate automatically generates form letters addressed to different people and fills in the data pertinent to each person.

This macro works as follows:

- 1. Figure 2 shows a sample letter and database that work with the example code given in Figure 1. Select a range of cells, go to the Draw menu, choose Paragraph, and start typing. You'll need to put double less-than and greater-than signs (<< >>) around your field names, which are typically column headings.
- 2. Select New Macro from the Macro menu, and type in the code in Figure 1 (you can omit lines following the semi-colons, as they're comments only). This macro applies to the example shown. To customize it, change the type in italics to fit your database.
- 3. To print your letters, select Run Macro from the Macro window.

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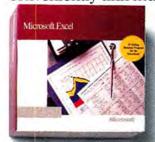
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Variance

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	Gross Profit	\$6,552	\$9,102	\$10,425	\$6,438	\$10,140	\$21,300
	%	119%	140%	150%	141%	108%	0%
	Variance	\$299	\$910	\$1,164	\$654	\$220	(\$3,969)
	Forecast	\$1,549	\$2,288	\$2,312	\$1,608	\$2,640	\$3,969
Cost of Goods Sold	Actual	\$1,848	\$3,198	\$3,475	\$2,262	\$2,860	\$7,663
	%	130%	140%	138%	92%	108%	113%
	Variance	\$1,947	\$3,500	\$3,850	(\$760)	\$1,000	\$2,400
	Forecast	\$6,453	\$8,800	\$10,050	\$9,460	\$12,000	\$18,900
Revenue (In Thousands)	Actual	\$8,400	\$12,300	\$13,900	\$8,700	\$13,000	\$21,300
		JUL	AUG	SEP	OCT	NOV	DEC
WxC 2000						Notable to a	

\$2,184

\$1,613

\$571

135%

\$3,198

\$2,200

\$998

145%

\$3,892

\$2,513

\$1,380

155%

\$2,610

\$2,365

\$245

110%

\$4,030

\$3,000

\$1,030

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\$4,725

\$600

118%

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Forecast

Variance

WinMark Copiers

TO: Shannon Pitts

FR: Peter Cohen

DT: November 13th, 1989

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And our assembly resources here in the

WxC 2000 JUL AUG SEP Revenue (In Thousands) Actual \$8,400 \$12,300 \$13,900 \$10,050

\$8,800 \$3,500

140%

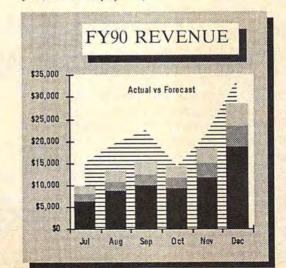
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Data Space Exploration

he problem is easy to state: You need to be able to locate information in files as quickly as possible. But Apple hasn't addressed that need in the present file system, and apparently it doesn't intend to in the next.

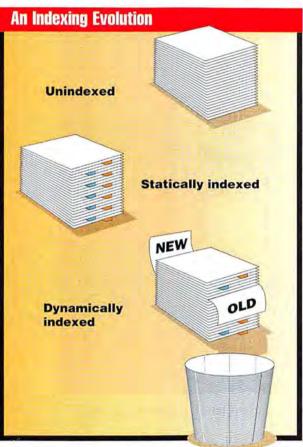
The file system is that part of the system software that keeps track of files. Apple did replace the original Macintosh File System with the Hierarchical File System - a marked improvement - and will be adding some powerful file-handling features in System 7. But will these features allow you to locate information in files as quickly as possible? Don't count on it. Take heart, though, Many minds are working on the problem, and they're coming up with a variety of solutions one of which you can put to use right now.

First a look to the future. Some feel that before long,

the very notion of a file system may become obsolete. Ted Nelson, originator of the term hypertext and a deep thinker about information handling, has for decades denounced "the tyranny of the file." The file, he argues, is an arbitrary encapsulation of data that serves chiefly to hide information. Nelson's vision of universal hypertext would provide sophisticated access directly to the text, without the interference of files.

In spite of Nelson's complaints, it's obvious that files do serve a purpose. We need some sort of encapsulation of data to avoid being overwhelmed by information, but it needn't be an

By Michael Swaine



Everyone's familiar with statically indexed databases such as phone books and dictionaries. On Location goes one step further by creating a dynamic index that updates itself automatically as your data changes.

arbitrary encapsulation. One approach to nonarbitrary data encapsulation is object-oriented design. Object-oriented interface design (directly manipulable objects) is at the heart of the Mac desktop metaphor, and object-oriented databases are making inroads at the high end of database design. Newsletter writer Esther Dyson predicts, "Object-oriented databases are not going to replace regular ones anytime soon. Instead, they will replace file systems. . . ."

It's a tantalizing idea, especially given Apple's deep commitment to object-oriented thinking. And accessing information with a Mac will surely take on a more object-oriented flavor. But this too is still in the future, and it isn't going to help you manage the mass of files that grows daily on your system.

The "Search for System 7" sidebar will give you a glimpse into file-management techniques of the relatively near future via System 7.

But a more immediate solution to your management problems could well be On Location, from ON Technology, former Lotus chairman Mitch Kapor's Cambridge, Massachusetts, company. It's a new utility that finds files, moves them around, and finds text information within them. Other utilities do some of these things. On Location does all these things and does them well. That makes it more than just another DA.

On Location is indeed mostly a DA, although it is

augmented by a Startup document. As with Find File, Apple's file-finding DA, you type in the name or part of the name of a file, and the utility tries to find it for you. With On Location, though, finding is a "hot" function: As soon as you start typing, it starts searching. Let me amend that: As soon as you start typing, it starts finding. Each additional character you type narrows its search; backspacing over a character broadens the search again. Even if you type nothing, On Location doesn't sit idle; it gives you a list of all the files on the disk or in the folder under examination.

You can also specify how the characters you type are to be used in searching. If you choose exact matching, On Location will search for files that explicitly match those characters. But

POWER TOOLS

you can also choose to have the program search for the typed characters at the beginning of the file's name, at the end, or just somewhere within the filename. And you can limit the search to just a folder or extend it to the whole disk. On Location also lets you search on the basis of a file's contents, which means you can get at the text in a file without knowing the file's name. The utility can list all files *containing* the word *Kapor* before Find File can tell you if there even

are any files named Kapor.

The Self-Indexing Advantage

Where On Location differs from other file-manipulation products is in its speed. I won't mention a lot of specific numbers since my experience is with a prerelease version, but one sample search took me 30 seconds with Find File and 10 seconds with On Location, including the time it took to invoke each utility. Most of the 10 seconds On Location took was invocation time, so the speed advantage would be even greater for subsequent searches.

On Location gets its speed by circumventing the Macintosh File System and using its own way of keeping track of files. It uses a technology called digital signature compression that creates a compact index to both the names of disk files and their text contents.

Here's how it works: On Location must create an index for each volume it will be dealing with. This one-time task may take an hour or so for a hard disk, and you may have to let it work overnight for a CD-ROM disc. The Startup document thereafter updates the index as you add or delete files. On Location performs its searches without ever looking at the files or at the directory. It looks only at its own index.

The index contains information not only about filenames but also about file contents. Text is the only kind of content indexed, naturally, but it's thoroughly indexed.

If you've worked with CD-ROM discs, you understand the idea of content indexing, or inverted indexing. The idea is to create a list of every unique word occurring anywhere on the disk and for each word to create a list of the places where it occurs. With a CD-ROM disc, such an index can be created once and placed on the disc; with a hard disk, you need to be able to update the index when files are changed. That's what the On Location Startup document quietly does in the background as you work.

Searching By Content

To look for files on the basis of their contents, you click on a different button than the one you used to search for files by name and type in the characters to be searched. The list you get contains the files with the text you've specified.

Once you've found a file, either by name or by contents, you can open it if it is more or less a text file. While you have



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a file open, you can select and copy text, but you can't modify the file's contents.

You can even search for a text string in files on an unmounted volume, because On Location is examining only the index it created itself. Of course, you can't open files on unmounted disks — that would be too good to be true.

It has a couple of nice touches: You can perform word-root matching, and you can easily select the previous or next file to examine.

Root matching is impressive — when it works. You type, for example, compute, and On Location finds files containing that word. It will also find the HyperCard Clip Art stack if it's on the disk, because that stack contains the word computer. The matching technique depends on having a dictionary and/or rules for forming plurals, verb forms, and so on. On Location would need lots of help to do this job reliably, but it doesn't come with any. Still, root matching is a nice feature, and you can use it when selecting files as well as when searching for a word in an opened file.

The previous/next-file feature can be handy for comparing files visually. Here's a scenario: You have two versions of a document, but you can't remember which one you liked best, or why. On Location lets you jump back and forth between the two and look for crucial differences.

On Location can display text from just about any file, not just text files, on any mounted volume, including the fields of a HyperCard stack. For certain word-processing file formats, it's also able to show stylized text. It has translators specifically for several of these formats.

The technology behind this feature, a XTND translator technology under license from Claris and originally developed at DataViz, is interesting. XTNDs are drop-in modules that Claris is putting into all its applications and is making available to developers for free.

The ability to search files by contents is a powerful feature in a utility, but it's rapidly becoming a necessary element in any adequate file system. When you have to keep track of a few dozen files you've created, you can probably recall what's in each just by looking at the name. But you begin to lose this ability when dealing with a few hundred files unless you have clear filenaming conventions.

If you have several thousand files on a hard disk or network, representing different versions of different elements of different projects worked on by different people, you're subject to the whims of others. As soon as someone names a file in an idiosyncratic way or moves it out of its proper folder, it can become a black box. There's no point in having to go through the trouble of launching a program such as PageMaker just to see what's in a file. Because Apple's file system doesn't provide access to the contents of files, it's good that someone is dealing with the need.

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Mr. John T. Vincent 77 Maiden Lane Greenwich, CT 05830

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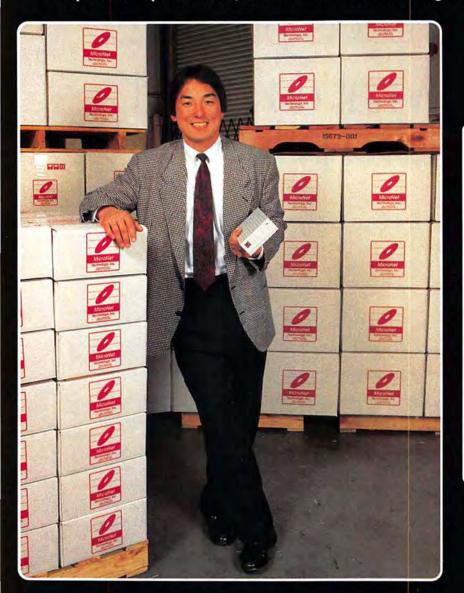
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POWER TOOLS



Winners and Users

I promised two months ago to present the winners of past puzzle competitions. As last month's discussion of CD-ROM discs and file management grew into two columns, I had to postpone the announcements until this month.

October's winner is Howard Bowers of Sarasota, Florida. The puzzle was to simulate the action of the forthcoming System 7 Trash, which will not empty until you tell it to. Howard solved it as I did, by covering the Trash with a trash folder and creating a macro for emptying the trash folder into the hidden Trash. An "I Beat the System" T-shirt is on the way.

November's winner is Suzanne Garner of Maple Grove, Minnesota. The puzzle was to determine how many nonoverlapping icons could fit on a standard (SE) Mac screen, subject to certain reasonable constraints. Suzanne discerned that the answer was 50 but didn't comment on the fact that the organization is that of the stars on an American flag.

December's puzzle was to slim the System file by removing resources. The winner is Hugh Miller of Mount Vernon, lowa. He got his System down to 51K, which is small enough to put FileMaker Plus along with the System, Finder, and ImageWriter files onto the

internal 400K drive in his 512K Mac. He used older versions of the System files and removed the DAs and all but the required fonts. He keeps unslimmed FileMaker Plus and System disks to run on his 800K external drive, but when he needs to dedicate the external drive to documents, this disk works well for him.

Some others who slimmed impressively, on a variety of machines, were Daniel Thiel, Chico, California; Arthur Wiese, Jr., Muskego, Wisconsin; Angelo Serra, Maumee, Ohio; John Scott, Jr., Greensboro, North Carolina; and George Csefai, Bridgeport, Connecticut. Users of orphaned Macs have the greatest need for such tricks, however, and Hugh really showed how to be resourceful by being resourceless.

January's puzzle turned out to be more puzzling than I'd intended. I presented a window and asked how the icons in it had been organized. The trouble is, the window shown in the issue was not the window I'd created, but was an entirely different window—apparently created by DTP gremlins. Tshirts go to Lloyd Loring of South Bend, Indiana; Randy Asher of San Ramon, California; Wade Van Buskirk of Mendocino, California; and David Lueders of Bethesda, Maryland, for their logical explanations for the gremlins' window.

Pound for Pound

For those of you who haven't snared a T-shirt yet, here's a brand new puzzle to consider.

How heavy is a megabyte of data?
It depends on the medium,
of course. Pound for
pound, a CD-ROM
disc is a more efficient storage
medium than
microfiche or
floppy disk, not
surprisingly; but between microfiche and floppy

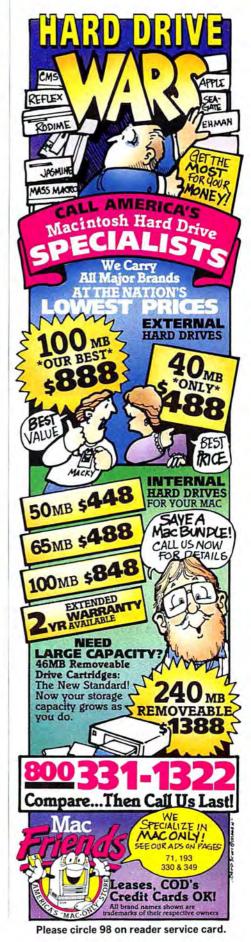
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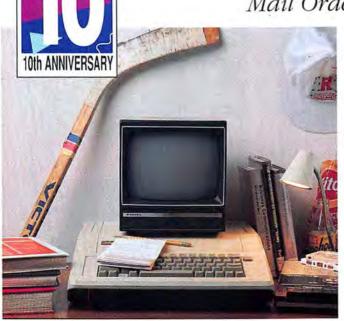
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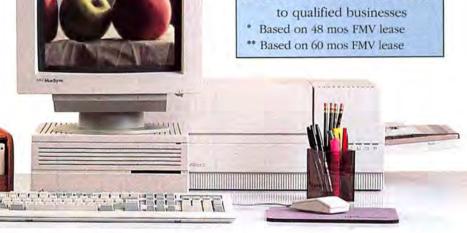
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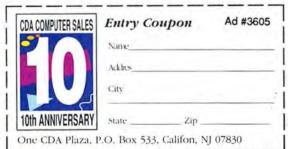
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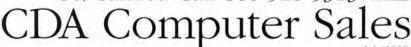
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POWER TOOLS



The Search for System 7

Several specific features of the new Finder, due out with the release of version 7 of the operating-system software this year, will affect file management. These features include alias files, an intelligent System Folder, containers, new tools for finding and selecting files, and custom views. There will also be more "things" to manage and a new categorization scheme that should make that management process more consistent and logical.

Today, the objects requiring management are chiefly files, which are classified as either applications or documents. INITs, cdevs, and other System Folder fodder are documents. But there are some objects with different behavior from either applications or documents: folders, for example, and the Trash and the desktop. Then there are volumes, such as disks; and devices, such as printers — all of which have characteristic behaviors and require management too.

Under System 7, each of these things, as well as any other objects with icons, will fit into one of five categories: applications, documents, containers, alias files, and desktop printers. And some of these are involved in System 7's approach to file

- or, rather, information - management.

Aliasation

The use of aliases is a simple and intuitive approach to the problem of nonhierarchical storage and retrieval.

Here's the problem: You have a file, a letter to your accountant spelling out some homemortgage facts pertaining to your 1989 taxes. Does it go into your Taxes folder or into your House folder or into your Correspondence folder? Put it in the wrong place, and you may have a hard time finding it later. This problem isn't unique to electronic filing systems — we've all heard stories of the file clerk who can't retire because only he knows where things are filed.

A partial solution in the case of the irreplaceable file clerk is to put some trace of the file in every folder where there's any chance that anyone would look for it. "Some trace" could be either a copy or a note pointing to the location of the file. This isn't a great system—things get messy as soon as you need to move or remove a file. But it can work for electronic filing, where it's possible to link the various traces of the file so that if one is moved, the others are updated. That's how System 7 does it, only better, and the technique used is the alias file.

You put the original file anywhere and create any number of alias files — then or later — to put into other folders or, say, out on the desktop. An alias file is not a copy of the

original but is a small special file containing the original's icon, a pointer to its name, and information about how to find the original (not a pointer to the original). When you select an alias file by double-clicking on its icon or picking it from a file dialog box, the original is opened exactly as though it had been selected directly.

What's more, with the alias files, you can move around and rename the original files

System 7 will finally start taking responsibility for its own files. This is important since there will be more rules than ever about where System files must be placed.

and the Finder will still find them. This works because of the way alias files refer to their originals. The usual way to point to a file is by its pathname, such as Office:Financial: Taxes:Letter to Chad. Aliases don't use pathnames; rather, they use instructions on how to locate their originals. For developers of applications too, this method will eventually replace the pathname as the main way to track files. This should mean that all (conforming) applications will always be able to find files — and quickly.

The use of aliases solves the problem of the tyranny of the artificial file hierarchy and does so in a way that is intuitive and direct, with a clear analogy to physical file systems. Aliases should make it easier to avoid losing files. Unfortunately, they won't help you find information if you don't know where it's filed.

New Finder Features

The new Finder has some features that will make it a better tool for finding information. There will be a Find menu selection much like the Find File DA, but the new Find will check all volumes, including AppleShare volumes, automatically. It will also retrieve the found file — opening and, if necessary, scrolling its window.

Related to finding files is selecting them. To currently select a group of files, you must combine some of these maneuvers: shift-click repeatedly, type Command-A, drag carefully, and/or shift-click to deselect

selectively. System 7 will provide a Select menu item, which will let you select files, folders, and other items according to the criteria you specify. You can select, for example, all objects created later than 3/29/89.

Another feature that will be useful for keeping track of files is the ability to create custom views. The hierarchic view should be particularly nice, as it will allow you to see the full contents of a folder (container), thereby

displaying all the levels of the hierarchy, not just the top level you see now. You will also be able to augment the filename with a multiline description placed next to or under the file's icon. Last month I praised long filenames for providing a descriptive window into a file, and these new descriptions are a logical extension of this, worthy of commendation.

Self-Help System

One annoying file-management problem is managing those files that applications or the System itself requires. The new System's intelligent System Folder brushes away this part of the file-management problem, correcting a design error in the user interface. There are some advantages

to having certain System-associated files in predictable places, but that's no reason to force users to do the System's file management for it. System 7 will finally start taking responsibility for its own files. This is important, since under System 7 there will be more rules than ever about where System files must be placed. The new approach is also flexible: The System will put these required files where it thinks they belong, inform you of the fact, and let you override the placement if you want to put them into a different location.

Containers will make for consistency but won't have much to do with finding things. They may have something to do with not losing things, because the new Trash container will act like any other container. This means that things placed in the Trash won't disappear arbitrarily. (The last time I suggested that the Trash's behavior was arbitrary, a reader wrote to explain the details of the trash-emptying algorithm. This misses the point. The current System empties the Trash on the basis of the System's needs, not the user's. And as the user's perspective is the only perspective that matters, this behavior is arbitrary.)

System 7's file-management benefits will multiply when applications begin to make use of the new Finder techniques for finding files. A technology called AppleEvents will let new conforming applications access files through the Finder.

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Windows Won't Kill the Mac

Microsoft Word for Windows is available, but maybe it shouldn't be.

eresy of heresies. I'm writing this column on my
IBM PC clone,
using Microsoft Word for
Windows.

Don't be too concerned. I haven't abandoned the Mac, which remains my favorite machine. Instead, I'm doing a bit of slumming to research an option and to make a point.

You've probably read the same articles I have: "Graphical interfaces such as Windows and Presentation Manager have caught the IBM PC up to the Macintosh," report the self-appointed analysts and would-be trend-spotters (or are they just reprinting Microsoft and IBM press releases?). Since you can buy a state-of-the-art PC for as little as \$2,000 (including a color display and 40-megabyte hard disk), these analysts are predicting the slow erosion of Apple's dominance in graphically oriented applications such as desktop publishing and multimedia.

Well, most of the predictions I've read aren't worth the paper they've been laser-printed on (probably using a Mac). Those who believe

By Thom Hogan



Word for Windows proves that the grass isn't always greener on the other side.

that Microsoft's new operating-system offerings have evened up the playing field are wrong — dead wrong.

Word for Windows

Let's take the program I'm using to write this, for example (Word for Windows 1.0). Now, installing Word on a Mac isn't particularly hard — you just drag the application file from the floppy onto your hard disk, and you can start using the product. The primary files

> for Macintosh Word even fit on a single disk (two, if you include the help and dictionary files), and since only three files are involved here, you don't have to worry too much about directory clutter.

> Not so with Word for Windows (I'll call it WoW from here on, but don't confuse that acronym with my opinion of the program). WoW comes on eight 1.2megabyte disks (or twelve 3.5-inch disks), the first of which is named Setup. You have to have all those disks handy, because you need every one of them to install a minimal WoW. WoW comes with a confusing single-page instruction sheet that attempts to describe some of the subtleties of installation but fails. (To get an idea of how confident Microsoft is about Windows, note the instruction that says "We don't recommend that you run Setup while Windows is running.")

After telling Setup where I wanted the program installed, I shuffled disks while the utility copied files to my hard disk. Then I got to a section of Setup that involved picking things from lists. Instead of the familiar point and select or drag-select we Mac users are so used to finding in list boxes. Microsoft forces you to use the arrow keys to move to a choice and then

press Enter, which returns you to the question that asks if you want to install a utility. To install multiple utilities, you must arrow, Enter, Enter, arrow, Enter, Enter, ad infinitum. To choose five files to copy, I had to press 20 keys! Sure makes you appreciate the Macintosh's click-and-drag system. Also makes you

POWER TOOLS

wonder if anyone at Microsoft has ever used a Mac.

Many keystrokes later, I got to the nitty-gritty of the installation: Windows and memory management. First, Setup told me it couldn't find a copy of Windows on my hard disk and asked if I'd like to have it install a run-time version? Say what? I sure as heck have Windows on my system. To make a long story short, it turns out that you must install WoW in the same directory (folder) as your existing copy of Windows in order for Setup to find it. That's sort of like telling a Mac user that all applications must be in the System Folder. Moreover, Setup didn't update the directory, so it appeared as if my hard disk was having problems. Fortunately, I figured out the problem and fixed it before I made any other changes to the disk.

WoW Doesn't Rate a Wow

So let's look at the product for a minute. Saves and loads are a little faster on the PC clone than on my Mac II. WoW does a slightly better job of keeping up with fast typing, at least in the little bit I've used it so far. But other aspects don't seem to be as interactive: Dialog boxes and menus all seem to have a perceptible delay, scrolling is slower, and picture drawing is much slower; so slow, in fact, that I'd suggest that inserting graphics should always be the last thing you do in a document. All in all, I'd call the performance issues a draw - the Mac version seems a little more responsive in general, but the PC version is faster at many things. Neither is going to generate performance complaints on a top-end machine (although the PC version would be sluggish on a standard XT or low-end PS/2 model).

Select Open from the File menu. Want to reference something in another folder (directory)? You'll have to type the directory's name correctly, complete with all those backslash (\) characters that separate parts of the DOS pathname. WoW has no point-and-shoot navigation aids in the Open dialog box. To find

my text files, I had to type D:\WIN\WINWORD\DOCS\TEXT.

How about this: Write something with WoW and save it. Then take the disk out of your PC and stick it into your Mac (or transfer the file via network or cable). Now try opening the file with the Mac version of Word. Sorry, different format! Most, but not all of your document will appear correctly on the Mac. Do the folks at Microsoft bother talking to one another? Apparently not. So which format is going to change, WoW's or Mac Word's?

Of course the menus for the PC and Mac versions aren't the same either. Mac Word has a well-deserved reputation for having a kitchen-sink interface that takes some getting used to (no clarity of interface design here). WoW's interface is comparable but different. The Search and Replace commands, for example, are now on the Edit menu. There are other design irritants as well. Selecting a range of text and pressing Backspace doesn't do anything in WoW (you have to press the

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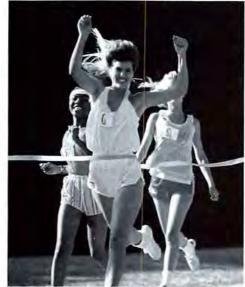
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Delete key instead). Need I go on? Suffice it to say that WoW is no Mac Word.

Other Windows Programs

So WoW is just poorly executed. Does this mean that the Windows-as-replacement-for-Mac camp might be right after all? The PC and Mac versions of Excel, for example, are much closer in interface, function, and file formats. If you know one, you'll feel right at home with the other. Yet even these program twins point out vast differences between the Mac and PC Windows products. Many of the things I think are wrong with Windows and Presentation Manager go beyond the menu structure and dialog boxes - problems that any Mac user will immediately comprehend but that may be hard for PC folks to understand (all those analysts are probably 1-2-3 crunchers, right?).

First, Windows looks ugly. Yes, ugly. WoW is trying its best to display Times 12-point type on my VGA display, but the x-height is exaggerated, the characters are squarish, and the black-on-white

text is nowhere near as crisp as it is on my Mac II's color monitor. On some monitors, the x-height of Times characters isn't as exaggerated, but then the squarishness of the font face makes the display less readable. Icons are particularly ugly in Windows, mostly because Microsoft has forced designers to create icons that look OK in several resolutions.

Printing presents another problem. WoW doesn't come with printer drivers for any printer I have available (where's the DeskJet driver, Microsoft?). I could, of course, hook up my expensive Post-Script printer to my inexpensive PC, but that seems to invalidate the premise of using the PC as an inexpensive substitute for the Mac.

Then there's Windows' insistence on giving everything a keyboard equivalent. Don't get me wrong — I actually like keeping my hands on the keyboard. But those little underline characters look obnoxious. Of course, without them, you'd never guess that Alt-T pulls down the Format menu or that the semicolon

key lets you set leading. A few commands' equivalents, such as using the Escape key for Cancel, aren't on the menus or in the dialog boxes.

The interface problem is bigger than it seems. Microsoft stol-, excuse me, licensed a core of ideas from Apple's Mac, but IBM insisted on making any new PC interface keystroke-compatible with something it calls SAA (Standard Application Architecture). The applications group within Microsoft seems to have its own ideas; it's hoping to get a BASIC-like language embedded into all applications and the operating system. The result is a visual and interactive mess.

OK, enough slumming. If you were thinking about adopting Windows as a low-priced alternative to the Mac interface, think again. Sometimes old clichés ring true: You gets what you pays for.

Thom Hogan edits *The Macintosh II Report*. Sample copies can be obtained by sending \$2 to Macreations, 329 Horizon Way, Pacifica, CA 94044.





A New Dimension In N

As a Macintosh owner, you spend a lot of money buying expensive application software. But when all is said and done, a spreadsheet, a word processor, and a paint program are general applications, often not capable of doing what you need them to do. They are separate, independent tools. They may have become indispensable to your work, but they don't work together to meet your specific needs.

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Illustration By Rob Magiera acintosh Programmir

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The Only Program You'll Ever Need

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rom pasta to prescription drugs, everything comes in generic packages these days. Now we'd like to introduce you to Generic App, a complete stand-alone application that provides a platform for just about any standard Mac program. It performs the simplest of application duties — initializing the Mac interface, monitoring user input, and managing multiple documents. It's generic because it can be used as a starting place for almost any programming project.

You may be surprised at just how much

code Generic App requires. In fact, because we promised our editors that we'd provide you with a complete, running program every month, what you're getting here is a stripped-down version of Generic — miniGeneric. We'll take two more months to flesh out some of the subtleties of Mac programs and complete Generic App. We'll eventually use Generic App as the basis for several handy utility programs, each of which will illustrate a particular aspect of Mac programming.

In this month's installment, you will learn about software hierarchies, which are an essential element of good software design. We'll also

> introduce two essential features of a Mac application: events and resources. Then we'll apply this knowledge to the operation of Generic App's menus.

Software Layers

Mac software is organized in layers, like an upside-down wedding cake (see Figure 1). The top layers depend on functions the bottom layers provide. Near the bottom of the hierarchy is the Macintosh operating system (OS), which mediates the boundary between the hardware and software and forms the foundation of our applications. Collections of software that act together to achieve the same goal on the system level are known as managers. A typical OS manager is the Device Manager, which provides access to standard devices through a structure called a device control block, or DCB. OS managers are a bit esoteric, and application developers can usually ignore the details of this layer. Indeed, that's what software layers are for - they encapsulate the details of the technology within themselves.

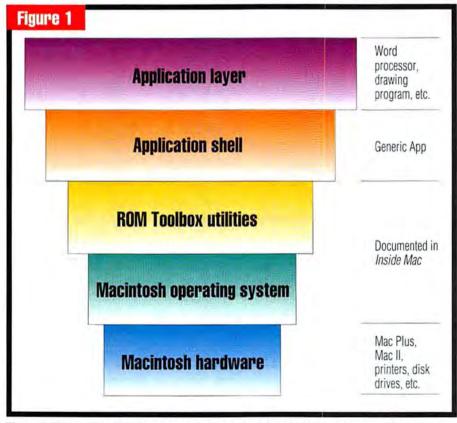


Figure 1: The familiar Mac interface is composed of several layers, arranged hierarchically.

By Kurt W. G. Matthies and Thom Hogan



Of greater interest to us is the next layer in the hierarchy — the application Toolbox. The managers here provide the Macintosh look and feel that we've come

to take for granted. The Window Manager, Menu Manager, and Palette Manager are all typical Toolbox managers.

Just a Shell

The next layer is the application shell, the supporting structure of an application. All Mac programs have menus, windows, dialog boxes, and so on. What distinguishes them from each other is their specific functionality. For example, in a word-processing program, the application layer consists of the modules that process text - the interface is supplied by the shell. We're borrowing the concept from object-oriented-programming (OOP)

texts, but the principle of layered, reusable code applies to our procedural environment as well.

Whatever your programming background, your first hurdle as a Macintosh novitiate is building the application shell. Once it's built, you can use it over and over again for every application you write. It's been said that programmers write only one program in their careers and spend the rest of their time modifying or fixing it—Generic App is the foundation for that one program.

Road Map of Generic App

The complete source code for this month's project is available from Compu-Serve. Simply type GO MACUSER at any ! prompt. If you are not a Compu-Serve user, call (800) 848-8199 or (614) 457-8600 for more information on subscribing. Alternatively, you can order the disk directly from us for \$10 by calling (800) 952-6300 and asking for Department 28.

You'll find that the miniGenApp folder

Table 1: Contents of miniGenApp Folder

Filename	Location	Purpose
miniGenApp	Project folder	Project file
miniGenApp.rsrc	Project folder	Project's resource file
Shell.c	Src folder	Main entry point, event parsing
Applnit.c	Src folder	Application-initialization routines
MenuUtil.c	Src folder	Menu utilities
WindowUtil.c	Src folder	Window sizing, movement, scrolling
DialogUtil.c	Src folder	Dialog-hook procedures
AboutBox.c	Src folder	About-box rendering
MiscUtil.c	Src folder	A catchall file
DocUtil.c	Src folder	Document management
FileUtil.c	Src folder	File I/O utilities
Display.c	Src folder	Drawing functions for application
XxxxPr.h	Hdr folder	Prototypes — one for each .c file
AppConstants.h	Hdr folder	Application constants (#defines)
AppGlobals.h	Hdr folder	Application global declarations
MenuConstants.h	Hdr folder	Menu-constant definitions

Imagine Losing Everything In Your Mac.

POWER TOOLS

contains a project file, a project resource file, a source folder with ten source files, and a header folder with the project's header files (see Table 1). Put the project folder into your Develop folder. You'll need all of those files to compile the project.

You'll remember that the C source code for our first project, Hello World (see "Hello, Programming," April '90), was in one file. Generic App is a much larger project, so we've organized the C source into ten files. Why split up the program? Every programmer will give a slightly different answer, but the main reasons are to isolate independent modules within the program (a process called encapsulation that makes it easier to debug and maintain a program); to keep the program code organized (as opposed to adding to it helter-skelter, which re-

```
Example 1
static TEHandle
                                /* static variable */
                    sCurTextHdl;
static Boolean
isCheckItem (short theItem)
                                         /* static function */
```

sults in what dedicated hackers call spaghetti logic because it snakes all over the place); to keep to a minimum the portion of code that must be recompiled and relinked when making small changes, as often happens in the debugging process; and to retain control over how the program gets split into code segments, which have a maximum size of 32K (more on that in a later column).

There's an art to distributing the functions among the source files; many factors come into play. Most routines fall together naturally by their actions - the trick is in determining where to draw the line. It might make the most sense to group all Clipboard functions in a single file, for example. That way, if you later make a change to your program that affects the Clipboard, you will know exactly which file to update to handle the change.

Another consideration is procedural encapsulation, which is achieved through the use of local functions. The scope of local functions, called static functions in

You create static functions by placing the static keyword before function names in their functionbody definition. Data encapsulation makes use of static variables. Static variables are like global variables, but their scope is limited to the source file in which they're defined, just as is the case with static functions. Example 1 demonstrates the syntax. Either of these constructs may have an influence on the layout of your

	C, is limited to the source
3	file in which they're de-
ı	fined. In other words,
ı	they can be called only
ı	from functions defined
ı	in the same source file.
ı	You create static func-

source code.

The	Main	Event

Without input, a computer is a useless hunk of hardware (unless you're in need of a high-end paperweight). A computer application needs to know when its user is pawing the keyboard or twiddling the mouse button. The OS laver's event mechanism translates real-world events initiated by the user into

		Message	When	Where	Modifier
	nullEvent		Ticks since startup	Mouse location at event	
Mouse events	mouseDown		Ticks since startup	Mouse location at event	Button state
	nouseUp		Ticks since startup	Mouse location at event	Button state
Keyboard events	keyDown	Character code Key code	Ticks since startup	Mouse location at event	Option, Caps, Shift Command keys
	keyUp	Character code Key code	Ticks since startup	Mouse location at event	Option, Caps, Shift Command keys
	autoKey	Character code Key code	Ticks since startup	Mouse location at event	Option, Caps, Shift Command keys
Window Manager	updateEvt	Pointer to window	Ticks since startup	Mouse location at event	
events	activateEvt	Pointer to window	Ticks since startup	Mouse location at event	Activate/ deactivate
	diskEvt	Drive-number result code	Ticks since startup	Mouse location at event	
	networkEvt	Handle to param block	Ticks since startup	Mouse location at event	
	driverEvt	Varies	Ticks since startup	Mouse location at event	
Application- defined	applEvt	3	Ticks since startup	Mouse location at event	
events	app2Bvt	3	Ticks since startup	Mouse location at event	
100	app3Evt	?	Ticks since startup	Mouse location at event	
1	app4Evt	7	Ticks since startup	Mouse location at event	MultiFinder suspend/resume



data structures available to the program. Events reach your application in the form of event records, which are in turn posted to the event queue, a data structure maintained by the operating system. Here's software layering in action — you never need to access an event record directly from the queue; instead, you obtain the next available one by calling an Event Manager procedure, WaitNextEvent.

Macintosh-Programming Caveat #1. WaitNextEvent is not documented in Inside Macintosh, but it is documented in a Macintosh Technical Note. See the "Getting Technical" sidebar for information on these indispensable references.

Generic App's shell spends most of its time in a loop, as do virtually all Mac programs. Each time through the loop, it checks to see if a new event has occurred. The WaitNextEvent procedure returns a nonzero result if an event is available, and it fills an event record with the event data. To illustrate this process, we've excerpted the event loop in Example 2.

In Generic App, we're interested only

```
Example 2
EventRecord
                       event;
waitTicks;
long
Boolean
                       result:
waitTicks = 10L;
for (;;)
              /* this loop never exits */
       result = WaitNextEvent (everyEvent, &event, waitTicks, OL);
if (result)
               switch (event.what)
                                        /* parse event type */
                      case mouseDown:
                              doMouseDown (&event);
break;
                      case keyDown:
    doKeyDown (sevent);
    break;
                      case activateEvt:
                              doActivateEvent (&event);
break;
                              doUpdateEvent (&event);
                              break;
```

in mouse-down and key-down events and the Window Manager's activate and update events. When we get one of these events, we use the event type to pass control to the corresponding routine. Figure 2 shows this event-parsing scheme.

The event data structure that is filled in by WaitNextEvent contains the what,



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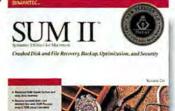
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*Steve Costa, MacWEEK, 10/3/89. **MacUser 1989: Editor's Choice, 5 Mice Rating, and Eddy Award for Best Utility. Macworld's 1989 Reader's World Class Award.

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when, and where data associated with the event. The contents of the record vary according to the event code that is returned in the what field of the event record. We've consolidated the possible event-record values in Table 2. A few notes about the table: The events are grouped by type along the left border of the table, and the event record's fields appear along the top. If a cell is blank, the value of the field is undefined for this type of event and can be ignored.

Macintosh-Programming Caveat #2. The Macintosh OS and Toolbox are constantly evolving. Just because a value is undefined at this time doesn't mean it always will be. Apple is very good about warning programmers (via the tech notes) when it anticipates changes that might affect existing programs, but it's not perfect.

Applications Have Menus

Most applications manage menus in the same way that others do — they install menus at initialization and treat them as static structures throughout the life of the program. Menus are initialized from menu descriptions that are stored in the application's resource fork or compiled into the program. Most commercial applications define their menus in a resource, which is an advantage because the menu strings can be changed without modification of the source code. We've used the resource editor ResEdit to create our menus.

Handle with Care

Before you can add a menu to your application, you should know something about memory. RAM is a limited commodity in any computing environment. Each application needs its own private memory space for its code and data. The OS manages memory as blocks of contiguous bytes, each block identified by a reference, and it keeps track of which blocks are being used and which locations are free.

Applications request memory through the Memory Manager. A reference to a block of memory, which happens to be a pointer to a pointer to the block, is called a handle. This double-indirection scheme lets the Mac move the block around in memory without directly affecting an application — and the Mac software moves memory whenever it needs a larger contiguous chunk of memory than is currently available, which is often. Because

our program keeps only the address of a pointer to the object (the handle) and not the address of the object itself, a handle's value doesn't need updating after a block of memory has been moved.

If you find all this address-of and object stuff confusing, don't worry — you're not alone. Pointers and addresses are at the top of the list of hard-to-understand C topics. We'll try to keep our handle usage as simple as possible until we can give you Pointers and Handles 101 in a future column In addition to facilitating dynamicmemory management, handles also contribute a "shorthand" notation to the language. Consider this: The data associated with each menu consists of many items the names and attributes for the menu items, the menu title, and other relevant information. This data adds up to a lot of bytes. It's highly inefficient to pass all that to a function — it would take more of the computer's time and space on the stack than is actually needed. Instead, you pass a handle, which means you pass a

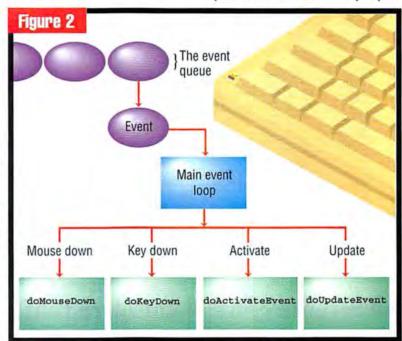


Figure 2: In event parsing, events are extracted from the event queue in the main event loop and passed on to functions keyed by event code.

Getting Technical

Macintosh Technical Notes are Apple's way of providing supplemental, timely information on the state of the art in hardware and software. They're written by folks at Apple's Developer Technical Support group and contain information on everything from tips and tricks (such as Note #007's discussion of great debugging techniques) to totally new ways of doing things (Note #158, for instance, deals with Multi-Finder and WaitNextEvent). More than 260 of these gems had appeared at the time of this writing, and there may be well more than 300 available by the time this magazine hits the stands (System 7.0 is just around the corner).

We'd be lost without them, and if you're a serious developer, you need them too.

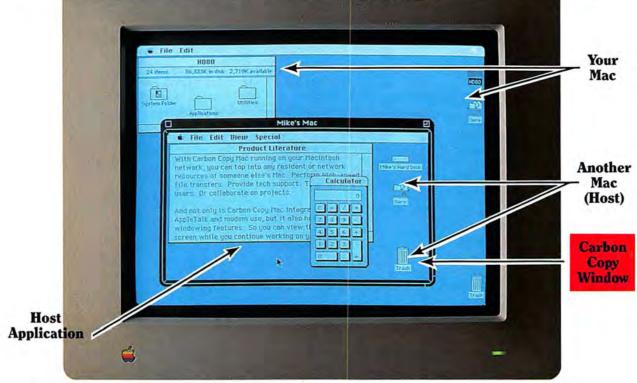
You can get them from the Apple Programmer's and Developer's Association (APDA) or download them from AppleLink. Apple Partners get them from Developer Tech Support as a part of the service.

Last spring. Apple released a tech-note HyperCard stack. This form is great for quick lookups, but the notes come out faster than Apple seems to be able to keep the stack updated. For \$25 a year, APDA will mail you each tech-note release, about six sets per year.

Apple Programmer's and Developer's Association, Apple Computer, Inc., 20525 Mariani Ave., M/S 33-G, Cupertino, CA 95014-6299; (800) 282-2732. AppleLink: APDA.

- Kurt W.G. Matthies

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4-byte key that the function can then use to access the data directly. So the Memory Manager is actually a built-in database manager — simple but effective.

Macintosh-Programming Caveat #3. Memory management on the Mac, despite the preceding simple description, is a black art. Scott Knaster, once known as the king of Mac program debugging. wrote an entire book on the subject (How to Write Macintosh Software, 2nd Ed., Hasbrouck Heights, New Jersey: Hayden, 1986). One reason Apple wants to do away with DAs and cdevs in future versions of the operating system is that they confuse and complicate the memorymanagement picture: You can write a "correct" program, only to find that a DA has come along and moved or changed memory on you, making your program crash. We promise to address this topic too in future installments, but for now, consider yourself forewarned.

What's on the Menu?

Here's an exercise: Use ResEdit to

```
setUpMenus - set up the application menus

setUpMenus ()

gDeskMenu = GetMenu (kAppleMenuID);
AddResMenu (deskMenu, 'DRVR');
InsertMenu (deskMenu, 0);

gFileMenu = GetMenu (kFileMenuID);
InsertMenu (fileMenu, 0);

gEditMenu = GetMenu (kEditMenuID);
InsertMenu (editMenu, 0);

DrawMenuBar();

/* setUpMenus */
```

look in the project's resource file, miniGenApp.rsrc. Resources, as we'll see in future columns, are a great way to organize an application's interface data. Each resource is "typed" by a four-character key. In this case, we're interested in the MENU resources.

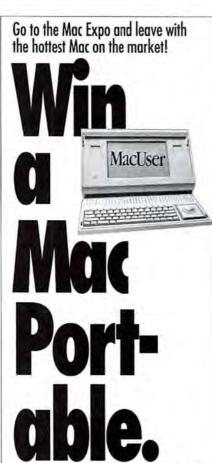
Open the MENU resource, and you'll see that the Apple menu is number 1, the Edit menu is 2, and the File menu is 3. All resources have a number and an optional name that identifies them within the resource type. Now open the File-menu template by double-clicking, and you'll see some of the data associated with this menu.

This menu data stored in the resource is called a *template*. The menu data is read from the template into RAM with the Menu Manager routine GetMenu, which

returns a menu handle to the data now in memory. All menu handles for an application are maintained in an internal data structure called the menu list, which makes them available to users through MenuSelect. Usually, you'll never directly change the menu list in your application - once more, the Toolbox hides the details of the system from you with an encapsulating layer of calls. One of the calls in this layer, InsertMenu, adds menus to the menu list. Example 3, which is taken from the file Applnit.c. illustrates the process.

We don't need to know all the details of DAs before we can add them to our Apple menu. Note the additional call to AddResMenu that's made when the Apple menu is being processed. The purpose of this particular call is to ask the system to look for DAs and then to add the

```
Example 4
        doMenu - handle menu selections
Void doMenu (long menuResult);
                menuID, itemNumber;
        short
        menuID = HiWord (menuResult);
itemNumber = LoWord (menuResult);
                                                   /* menu number in high word */
/* item number in low word */
        switch (menuID) (
                                                   /* which menu is it? */
                case kFileMenuID:
                         doFileMenu (itemNumber):
                         break;
                break:
        ) /* end switch */
        HiliteMenu (0);
                     switch menu choice to appropriate function call
void
doFileMenu (short theItem)
        switch (theItem)
                case kNewItem:
                         doOpenDoc ();
                         break;
                case kCloseItem:
doCloseDoc (FrontWindow ());
                        break:
                case kOuitItem:
                         cleanExit (true);
break;
    doFileMenu */
```





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MacUser

POWER TOOLS



DAs' names to the menu.

Read Any Good Menus Lately?

An application needs to react to user selections. We call this reading the menu. When a mouse-down event is detected in the menu list, MenuSelect automatically takes care of the menu-display and -selection chores that you normally associate with a menu selection. When MenuSelect has finished updating the display, it returns with the menu and item number of the selection.

Example 4 demonstrates choosing an action based on a menu selection. Our function, doMenu(), is called after MenuSelect has done its work. doMenu() is passed a long word (4 bytes). The top word contains the menu ID of the selected menu, and the bottom word contains the item number the user has selected. HiWord and LoWord are Toolbox macros that extract these parts of the long word.

The menu-selection parser is a twostage switch. The first stage determines which menu was selected from menuID and passes itemNumber to the selected function forthat menu. The second switch, which is illustrated by doFileMenu(), determines the item number selected and calls the action procedure for that particular selection.

Give Me a Break

Note the break statement that terminates each branch of the switch. Without a break, the flow of control would "fall through" and execute the next case.

Consider the variation on an excerpt of doFileMenu() in Example 5. When you select New from the File menu, control flows to doOpenDoc(), but because we forgot the break, when the time comes that doOpenDoc() returns, doCloseDoc() will be called. You see the window open and then immediately close. Leaving the break out of a switch branch is a common mistake made by both beginning and experienced coders.

Putting It All Together

Well, we've done it again. If you've already compiled and run the application, you know that we've written yet another Hello World. Is this déjà vu? Sure, but we now have a genuine eventprocessing platform. Check it out. Open a DA, and drag it in front of your window. Now close it. Notice how the application automatically updates the window. What you've got here is a real Mac update engine that's (almost) ready to support multiple documents. Next month, we'll talk about this update mechanism and create some real document windows that respond to all sorts of variations in size and location. Also, we'll have more on resources and memory. Happy traces.

P.S.: What's Bugging You?

There's a lot of code in Generic App that we can't cover in a line-by-line description within the confines of this column. What we're trying to give you is a practical background in primary concepts. This information could also come in the form of implementation descriptions, but as we stated at the outset, the bulk of the work is left to you. We don't think you want us to paraphrase *Inside Mac*, and we also know that there are some good how-to books available. We don't want to give you more of the same here.

But what is really bugging you, and how can we help? C-language syntax can certainly be cryptic. Perhaps you just can't fathom pointer manipulation or passing arguments to Pascal functions. Maybe you've read the chapter on the Resource Manager in *Inside Mac* five times, and you still can't get your resources written to a file. (We'll bet that you need to call ChangedResource before WriteResource!). What else do you need to know about Macintosh programming?

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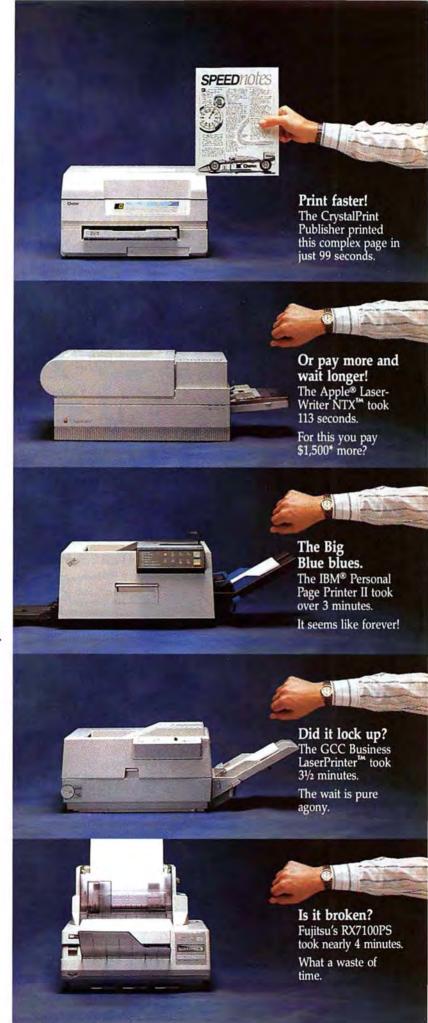
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Creating Resources and Menus

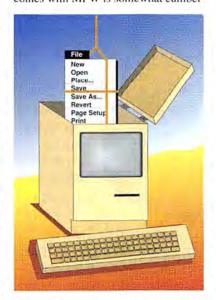
esources are vital to any Mac program. Indeed, a correctly designed program should define in the resource fork of the file all menus, dialog boxes, alerts, icons, pictures, and text strings that are displayed. That way, any changes you need to make — perhaps you need a Spanish version of your program? — are confined to the resources and don't affect the program code.

The problem with resources is that Apple has provided us with two notquite-finished ways to deal with them. The traditional method has been to use ResEdit, a funky little what-vou-see-isalmost-what-you-get editor that lets you manipulate the resources in a file directly (even after the program has been compiled). You can create some resource items, such as dialog boxes, exactly as the user will see them in your program (you simply create items and drag them to the appropriate places). Other resources, particularly menus, require you to painfully fill in a series of editText boxes - make one mistake (and you probably won't see it because there's no visual feedback to show how your menu will look), and you're liable to mess up your program to the point where it crashes. Adding keyboard command equivalents, hierarchical menus, and other options is a real pain with ResEdit.

Apple's second method is to use Rez, part of the MPW (Mac Programmer's Workshop). Rez lets you create resources by describing them with a structured text file. In some ways, this is a preferred method because you get maintainable source code for the resources that can

By Thom Hogan

easily be passed along to other users, either on paper or as a file. Unfortunately, it comes with the baggage of MPW as overhead. If you're not a traditional UNIX programmer, you'll probably have trouble understanding MPW, let alone figuring out how to get Rez to run. The editor that comes with MPW is somewhat cumber-



some, so I suggest you get a copy of the QUED Programmer's Editor if you're going to do much editing in MPW.

Fortunately, there are several other ways to create resources that are more Mac-like. The one I like most is an extension to ResEdit that makes the menu portion of that program a WYSIWYG menu editor. This add-on is a shareware product (Alan T. Goates, OtherWare, 310 S. 13th E., #5, Salt Lake City, UT 84102). Unfortunately, the latest version I have is for ResEdit 1.1d3, and ResEdit has since moved up to version 1.2. Perhaps Alan will have caught up with Apple by the time you read this.

Next best is Prototyper. Forget Prototyper as a creator of generic application code - its real value is as a resource maker. Unfortunately, Prototyper too has flaws. In the menu section, for example, adding new selections to the end of the menu is not particularly intuitive, and cut-and-paste functions are not available. meaning you have to move things manually one at a time if you change your mind about placement. Prototyper's interface needs a bit of work, because many of its pieces don't always work as you might expect (try tabbing between editText boxes, for instance). Nevertheless, Prototyper is well worth the effort you invest in it, especially if you're interested in seeing what the menu and dialog-box structures of your program look like before you commit them to code.

Now that you know all the options for dealing with resources, let's try them out with the Generic App program in this month's Power Programming column.

Pull up ResEdit, and create a new file called GenApp.rsrc. (Press Command-N, and then enter the name GenApp.rsrc.)

Create a new menu resource. (Press Command-N, and pick MENU from the list that appears.)

☼ Create a new menu. (We'll start with the Apple menu — enter a MenuID of 0 and a ProcID of 0. Next enter Enable Flags of −1 and the name of the menu. Starting to see why this is a pain?)

Click on the group of five asterisks at the bottom of the menu information — you should get a box around them. Press Command-N to create a new menu item. Fill in the boxes for that item (for now, just the name is enough). If you need more menu items, click on the asterisks at the bottom of the last menu item and press Command-N again. The trick here is to learn that the asterisks are associated with menu items — if you want to copy, cut, or paste, make sure you have selected a set of asterisks first.

When you've finished with your menus, click on the GenApp.rsrc title bar to make that window active and then click on its close box. To save your work, click on Yes in the dialog box that appears, and then quit ResEdit. If you're working with MultiFinder, this is the safest way to save your work with ResEdit — we've encountered situations in which other methods, including attempting to quit (by pressing Command-Q), result in crashes.

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Tip Sheet

Readers Share Their Tips and Tricks

PageMaker 3.0

PageMaker has no menubased command for vertical justification, but you can vertically justify columns in a primitive fashion. Assuming the tops of all the columns are even, this procedure gets the columns to line up perfectly along the bottom of a page:

1. Measure the distance between the bottoms of two columns and the bottom of the page, and divide that number by the number of paragraph endings in the shorter column (if the shorter column ends with a whole paragraph, subtract one from the total). **2.** Highlight all the paragraphs in the shorter column except for the last one, press Command-M, and type the number you found in step 1 in the Spacing After box. The shorter column will expand to fill the extra space.

Sue Ann Sanders Milwaukee, WI

Stufflt

If you need to send more than 20 files via modem, you'll need to send data in at least two sessions. Save yourself some time by enclosing all the files in one folder. Stufflt can archive entire folders of various sizes.

Jessica Bowmann Truth or Consequences, NM

HP DeskWriter

You may notice when printing a document that extends from top to bottom on a U.S. letter-size page (a Reflex Plus report, for example) that the HP DeskWriter leaves the bottom inch of the paper blank and prints those last lines on a second sheet. To fool the DeskWriter into printing all the data onto the letter-size paper, use the Page Setup command to indicate that you are using U.S. legal-size paper even though you aren't.

Clayton L. Olson Santa Cruz, CA

Illustrator 88

Incorporating a bit-mapped image from a program such as MacPaint into an Illustrator 88 illustration is difficult because Illustrator can't import a paint or PICT graphic into the Artwork mode by using either the Place command or the Clipboard.

The workaround is simple and takes advantage of the fact that Illustrator can import or place an EPSF image into Artwork. Use Aldus Free-Hand's Place command to import your paint graphic into

a new FreeHand document. Then use FreeHand's Export command to save the placed graphic as an EPSF file. Now return to Illustrator and place the FreeHand EPSF graphic. Don't forget to select "Show placed images" in the Preferences dialog box of Illustrator's Edit menu to view the placed EPSF files in both the Artwork and the Preview modes.

If you want to import this whole hodgepodge into a page-layout program, check the box in the Save dialog box to "Include copy of placed Encapsulated PostScript files for other applications."

Uri Marcus Haifa, Israel

Word 4.0

Are you annoyed by having to select Show Ruler from the Format menu every time you open a Word 4.0 document? You can make your documents open with the ruler automatically displayed by using Commands from the Edit menu. Here's how to do it:

- 1. Open any Word 4.0 document. Make sure Full Menus is selected.
- Choose Commands from the Edit menu.
- **3.** Make sure the dialog box says "Configuration: Word Settings (4)" in the lower left corner. This tells you the name of the file you're customizing.
- **4.** Scroll down the command list until Open Documents With Ruler shows up. (Shortcut: Press the O key to jump to the beginning of the O listings.) Click on the command name to select it.
 - 5. Click on the Add button.
 - 6. Click on Cancel.

The Open Documents With Ruler command will now be listed on the Format menu. It won't be checked, though, so you'll have to activate it. Highlight the new menu command to select it. Every document you open from now

Tip of the Month FileMaker II FileMaker II's network file-sharing ca-When a user wants to send a message, he or she types the message into the field pabilities let vou set up an impromptu messaging system among several Fileand presses the Enterkey. At that point, the Maker II users on an AppleTalk or TOPS record will be updated on the screen of anyone else who has the file open. To send network. Create a file called something a new message, any user can select the old like Public Messages, with a single recmessage and replace it with a new one. The ord, a single text field, and a layout that only catch is that users must press Enter contains that field. Uncheck Exclusive on the File menu so that several people can after posting a message - that updates use the file at once. Have all the users on others' screens and releases the record so the network open the file and park its that others can enter new messages.

Andy Shaw

San Rafael, CA

Public Messages

I'm going to make the Customers file "Exclusive" so that I can run the monthly reports - anyone have a problem with that?

window at the bottom of their screens (see

Figure 1).

Figure 1: Users of a shared FileMaker II file can communicate with each other on an AppleTalk or TOPS network by creating a separate Public Messages file.

Compiled by Gregory Wasson

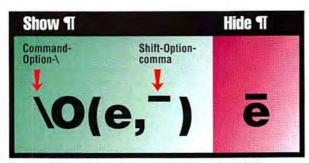


Figure 2: The combination of Word's formula-building feature and the macron character in most Adobe typefaces lets you put macrons over vowels.

on will automatically show the ruler.

It's worth looking through the entire list of commands in the Commands dialog box, since many useful items are tucked away in there, and some of them aren't documented in the Word 4 manual.

Bob Lowe Minnetonka, MN In response to Allen Morrison's query in Help Folder about macrons (December '89): There is some hope if you use Microsoft Word. In most Adobe laser fonts, you can access a plain macron character(") by pressing Shift-Option-comma (although the macron may not show onscreen if you don't have the

appropriate screen font).

Microsoft Word's formula language allows you to overstrike one character with another, placing a macron over long vowels.

To put a macron over the desired vowel, type the Formula character, Command-Option-\(it\) may not be visible if the paragraph markers are hidden, so make sure Show \(\frac{1}{2}\) is checked on the Edit menu, or press Command-Y). If you get a beep instead of the Formula character, select Full Menus from the Edit menu.

Type an O, for Overstrike, and then type (e, \bar{e}) — as shown in Figure 2.

Andrew Roazen Westfield, MA

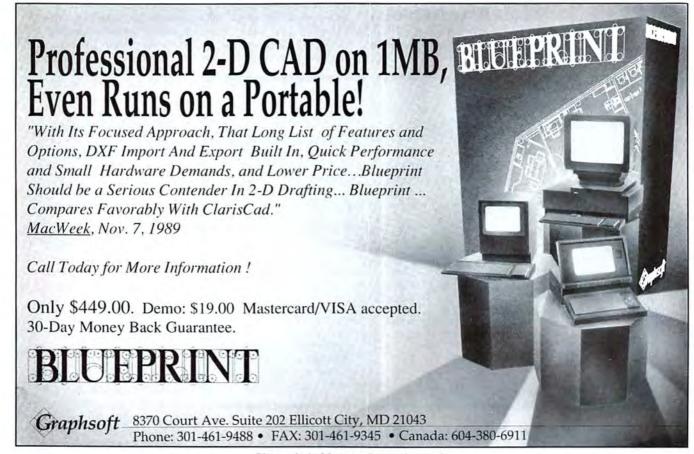
[You can also buy fonts that include special keys with the macron character. One good source is Linguists' Software. P.O. Box 580, Edmonds, WA 98020-0580. — Ed.]

Word 4 and AutoMac III

David Rosenbaum's Tip in the December '89 issue for search-and-replace operations for type styles, using Word's RTF format, is a wonderful discovery. But there's an alternative that may work more quickly, especially in shorter documents.

Here is an AutoMac III macro for changing italics to underline. (AutoMac III comes bundled with Word 4.0. If you haven't installed it, place the file AutoMac III in your System Folder and restart your machine. The AutoMac III icon appears to the left of the Apple menu.)

First, use Command-9 (9



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on the numeric keypad) to get to the very beginning of the document. Now type a word in the type style you wish to change from — for example, type *italic* in italic — and select that word. Then type or perform the following steps:

1. Click on the AutoMac
III icon and assign a keystroke
to run the macro, such as Command-Option-U for underline.
Click on Record.

2. Type Command-Option-R, which finds the next occurring instance of the selected type style.

Click on the AutoMac III icon, and add a time delay of five seconds.

 Type Command-Shift-I. This toggles the italic style, in this case to off.

5. Type Command-Shift-U. This toggles the underline style, in this case to on.

6. Type Command-9 (numeric-keypad 9), which returns you to the beginning of the document.

7. Type Command-Shift-6 (numeric-keypad 6), which selects the word *italic* again.

8. Click on the AutoMac III icon. Click on Misc. Click on J (Jump to a Macro). Jump the macro back to itself by typing its name (Command-Option-U), which causes the macro to repeat until all italicized words are converted to underline.

9. Click on OK. Click on Stop.

To run the macro, make sure you've put a word at the very beginning of the document in the style you want to change from and select that word. Then type Command-Option-U (or whatever keystroke you've assigned to the macro).

Your macro will repeat until all italics are converted to underlines. When a dialog box asks, "Continue checking from beginning of document?" type Option-period to stop the macro, then click on Cancel. Otherwise your macro will change your underlines back to italies and back to underlines in an endless loop.

This macro can be adapted to interchange any fonts or character formats. For example, to change random occurrences of Venice to Zapf Chancery, put a word in the Venice font at the very beginning of your document. Then, instead of using the two toggle commands. I've described, record into your macro the selection of Zapf Chancery from the Font menu.

Robert J. Yanal Southfield, MI

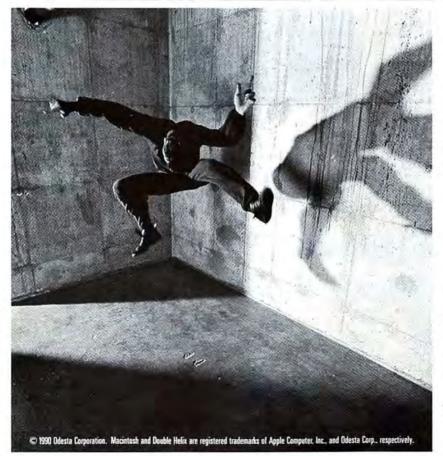
Ready, Set, Go! 4.5

Underlining text that has been selected as italic from the Style menu can be tricky in Ready,Set,Go!

If you're like most users, you double-click on words to select them and then make style changes. However, as with most word processors, double-clicking on a word in Ready, Set, Go! selects both the word and the space after it. If this word is then underlined, for example, the space following the word will also be underlined.

You can eliminate this problem by simply pressing the Command key when double-clicking on the word. This ensures that the space after the selected word won't be selected too.

Michael Conley San Diego, CA



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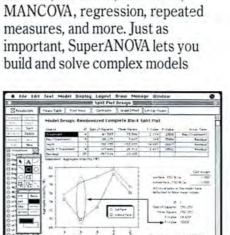
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Help Folder

Answers to Readers' Questions

Is your Mac sick? Need a diagnosis? Leave it up to the doctor — Bob LeVitus. He's the author of Dr. Macintosh: Tips, Techniques and Advice on Mastering the Macintosh and the former editor-in-chief of MACazine. Now he's also the guy who answers your questions in this space every month.

Mystery Font

Q. Why does LaserStatus DA report that there is a font called Seattle in my LaserWriter Plus? Font/DA Mover doesn't find Seattle installed in my system. Disk-Top doesn't find a file called Seattle anywhere on my hard disk.

Interestingly, this mystery font is visible only after the printer has been used. In other words, if the printer has been shut down and restarted (or reset with LaserStatus) and I use LaserStatus to examine it before anything is printed, Seattle's not there. It appears only after I print a file (any file, I think).

Randall Hunt Simi Valley, CA

A. You're not imagining things. When you print a document, the printer driver downloads Seattle; it remains resident in your printer until it is shut down or reset. The reason why is less clear. . . .

I couldn't discover an official explanation of why the Apple laser-printer drivers download the Seattle font, but I did hear some stories. The one that rings truest (at least to my ears) was that Microsoft Multiplan — an early, unsuccessful predecessor of Excel — used a funny font called Seattle, which Microsoft thought looked good on the screen and printed nicely on the ImageWriter.

When the LaserWriter appeared on the scene and Multiplan owners tried to print with it, the Seattle font came out looking just like it had come from an ImageWriter, because the printer didn't know about any font called Seattle and downloaded the bit-mapped font.

Instead of leaning on Microsoft to update its software and abandon this font, Apple had the LaserPrep file create the Seattle font whenever the printer is initialized, just in case someone wanted to print a document with Multiplan.

Hesitant Accelerator

Q. I want to upgrade the speed of my Macintosh SE (20-megabyte hard-disk drive; 4 megabytes of RAM) with an accelerator board. Because I've heard of people running into compatibility problems with software programs, INITs, and cdevs, however, I'm a bit wary of upgrading.

Which accelerator boards work 100 percent with a Macintosh SE configured like mine?

Kenneth J. Brom Riverside, IL

A. Accelerator products for the Macintosh SE are much more reliable today than they were a year or two ago. You will find very few programs, INITs, or cdevs that won't work with the newer ones.

Radius is a well-known brand with an excellent reputation. Or, if you're still concerned about compatibility, spend the big bucks and go with the Apple SE/30 upgrade.

Bar Codes

Q. I've heard that the U.S. Postal Service uses bar codes to direct mail. Do you have any information on how bar coding might be used in addresses and what format this would take?

Foster C. Wilson Newark, OH

A. If you already have a Mac and a laser printer, all you need is the excellent envelope-printing DA, Kiwi-Envelopes! (Kiwi Software, 6546 Pardall Road, Santa Barbara, CA 93117; [805] 968-7432). It can generate bar

codes designed with the assistance of the U.S. Postal Service to yield envelopes with a high readability rate. Kiwi-Envelopes! takes care of everything for you, and it has a slick, intuitive interface you're sure to appreciate. Another nice touch: The manual contains an excellent discussion of the Postal Service's Post-Net bar-code system.

Although KiwiEnvelopes! can be used with an ImageWriter for addressing envelopes, you'll need a laser printer if you want to use the bar-code feature.

Missing Buttons

Q. I subscribed to your magazine four months ago and received the MacUser HyperDisk. I enjoy the magazine and find it useful, but I haven't been able to

Scrambled RAM

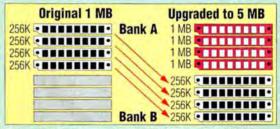


Figure 1: Where you put which SIMM makes all the difference in Apple's 68030 machines. For more details on installing memory, see "The Persistence of Memory," February '89.

Q. I own an SE/30 with 1 megabyte of RAM. I bought four 1-megabyte SIMMs and installed them in the SIMM slots next to the already installed bank of 256K SIMMs.

I expected that my machine would then have 5 megabytes of RAM; instead, it has only 2 megabytes.

Should I have put the 1-megabyte chips into the slots that had the 256K chips in them and moved the 256K chips to the empty slots?

Terry Otness Petersburg, AK

A. Yes. Starting from scratch: Move the 256K chips to the empty slots; then fill the slots you removed the 256K chips from with the 1-megabyte chips (see Figure 1). Voilà! Five megabytes of RAM.

By Bob LeVitus

make any of the buttons on the HyperDisk transfer to my HyperCard stacks. When I use the transfer utility included on the disk, the icon flashes, indicating a successful transfer. Howeyer, I can never find the button image anywhere in the target stack.

Lawrence J. Weber Denver. CO

Figure 2: PREC

to six custom

ImageWriter.

Manager makes it

easy to specify up

paper sizes on an

ImageWriter Funny Papers

Q.Inever select the European paper sizes (such as A4) in the Page Setup dialog box, but I would like to use 8.5-x-5.5-inch paper. Is there an easy way to modify these default sizes?

Waukesha, WI

A. You don't say what printer you're using, but if it's an ImageWriter, you're in luck. There's a freeware utility called PREC Manager, created

Untitled			
Paper Type		midth	Height
US Letter	111	8.500	11.000
Rick's Custom Size	121	8.5	5,5
US Legal	131	8.500	14.000
LittleLabels**	141	2.50	1.00
BigPaperWide	151	14.000	11.000
Some Other Size	161	8.500	4.125
Number of Active Types		6	Show Me

by Bill Steinberg, coauthor of Pyro!. (It should be available from the usual shareware outlets: CompuServe, user-group libraries, bulletin-board systems, and so on.) PREC (which stands for Print RECord) Manager lets you modify any of the six ImageWriter paper sizes (see Figure 2) quickly and effortlessly.

- A. What you transferred were icon resources, not buttons or pictures. That's why you can't find them they're hidden deep in the bowels of the stacks you transferred them to, waiting to be used. Here's how to use them:
- 1. Select New Button from the Objects menu.
- 2. Double-click on the new button.
- 3. Click on the Icon button in the dialog box.
- **4.** Scroll until you find the icon(s) you transferred.

If you want to use the icon with an existing button:

- 1. Select the Button tool.
- 2. Double-click on the button into which you want to put the icon.
- 3. Click on the Icon button in the dialog box.
- 4. Scroll until you find the icon you want.



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He'd Rather Fight than Switch

Q. On page 237 of the September '89 issue, you advise Kyle G. Murphy that it is OK to use the Reset switch on the Mac. You may be right, but I had a serious problem with such use on my SE/30. Ultimately I lost everything on my hard drive.

In attempting to find the cause of the problem, I ended up working with a systems engineer inside Apple. He felt that the cause of my problem was clearly my use of the Reset/Interrupt switch. He strongly advised that nonprogrammers stay completely away from it. I took mine off entirely.

Neil M. Kosterman Itasca, IL

A. Poppycock! The Reset switch is perfectly safe to use if you use it only when your Mac has irrevocably crashed. If you happen to push it while you have a document open, you can indeed damage a file or disk. But the damage will be no worse than if you had pulled the plug or flicked the power switch.

I agree with what Chris Espinosa said in his reply to Kyle: "The same Reset signal gets sent to the Macintosh if you turn on the Macintosh or press the Reset half of the programmer's switch. So if the Macintosh has truly crashed, the Reset switch is just as safe (in fact, a little nicer, because it puts less stress on the power supply and other circuitry)."

The programmer's switch can even help prevent damage from some crashes. Here's a little trick that can help you escape gracefully from certain crashes. Press the Interrupt switch and type:

SM 0 A9F4 (press Return) G 0 (press Return)

If it works, which it does at least half the time, you'll be returned to the Finder. Once you're back at the Finder, you

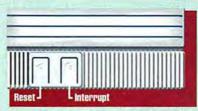
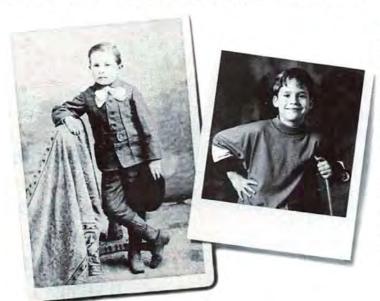


Figure 3: Is the programmer's switch just for programmers? Not if you know when to use it.

can select Restart from the Special menu, which gives your Mac a chance to shut down the file system properly and minimizes the risk of damage to disks or files.

As long as you use the Reset or Interrupt switches only when your Mac is hopelessly crashed, using the switches is as safe as, and probably safer than, turning your Mac off and on.

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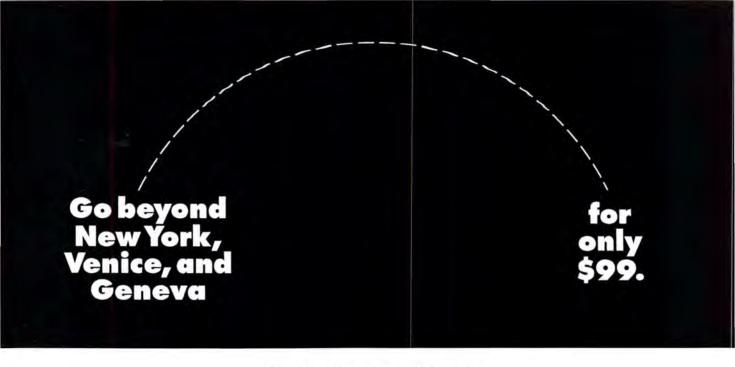
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The Pantone Touch

e waited a long time for color to come to the Mac. Like Dorothy in *The Wizard of Oz*, we stepped from a black-and-white world into somewhere over the rainbow. Unfortunately, when we try to

print the vibrant colors that appear on the silver screen, the results often seem just a pigment of our imagination.

This problem didn't start with the computer. Color is a form of communication, and not everybody speaks the same language. Our eyes, for example, see far more colors than can be created with the RGB (red, green, blue) scheme that monitors use. The CMYK (cyan, magenta, yellow, black) system used for four-color printing offers an even smaller subset of colors.

These trickle-down color theories mean we can rarely match what we see in the real world. In traditional publishing, there are color-matching systems that ensure that the color from the designer's desk matches the color on the print-

ing press. The PMS (Pantone Matching System), the most prominent color-matching system, and its compatriots are now wending their way to the Mac. Thus far, however, many Mac publishers find them less functional than a box of crayons for getting a matching color on paper.

Setting the Standard

In the publishing industry, Pantone is the reigning standard for spot color. For more than 25 years, Pantone has provided color references such as the Pantone Color Formula Guide, a book that contains solid-ink samples printed on Pantone is becoming ubiquitous as the color standard on the Mac. But is it a panacea or placebo for your color ills?

By Steve McKinstry

coated and uncoated stock. Designers make their selection from among 747 Pantone color samples that show the printed ink color and then give the Pantone color number or a tear-out chip sample to the printer, who uses it to mix the ink formula.

An alternative to picking multiple spot col-

An alternative to picking multiple spot colors is to convert each Pantone color to screen-tint percentages and print it as a process color, using CMYK inks. The Pantone Process Color Simulation Guide shows each solid-ink sample next to the closest match produced with Pantone's recommended screen percentages and approved inks (see Figure 1). Some colors are closer than others — because of the limitations of CMYK inks, not even Pantone can always achieve a perfect match.

Pantone licenses its system to third parties such as Letraset, which markets a line of matching colored papers, markers, and transparent films. More recently, Pantone has popped up in color software and output devices for the Macintosh. The list of licensees is growing rapidly and includes programs such as Illustrator 88, FreeHand, PageMaker, QuarkXPress, PixelPaint, and Letraset's Studio applications. The first printers to implement the Pantone system are the QMS ColorScript 100 and Océ's Color PostScript Printer.

For the Mac, Pantone offers 736 of the colors in its 747-color library — some of the high-intensity (fluorescent) and metallic colors aren't included. Only values for coated

stock are used, because of their popularity in color work. When Pantone licenses its color system to a hardware or software company, it provides that company several sets of numeric values. called lookup tables. These include RGB values for displaying Pantone colors on your monitor, a general set of CMYK screen percentages, and specific CMYK screen percentages for Pantone-licensed output devices such as the ColorScript 100. Some software vendors (Quark, for



values, using letters instead of numbers. A is the lightest and Z the darkest,

while O stands for no tint.

b Graphics Post Furostil. 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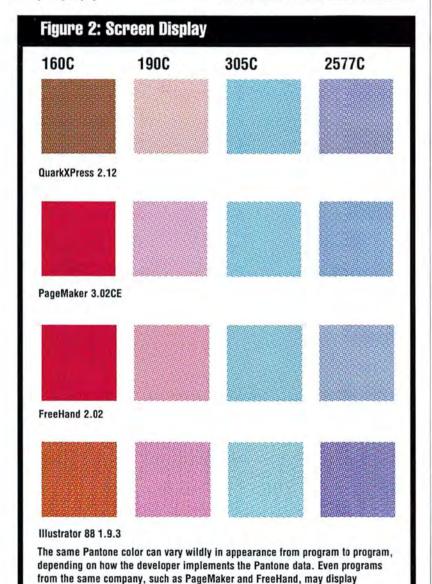
example) incorporate these values into the main program; others store them as a separate file (such as FreeHand's PAN-TONE Colors file) that the program accesses when needed.

For many users, the mere mention of Pantone's name in a Mac application inspires trust in the resulting color accuracy. Unfortunately, the truth is that Pantone colors can vary wildly from program to program, monitor to monitor, and printer to printer. Some, but not all, of these problems are beyond Pantone's control. Variables such as paper color and quality, equipment condition, screen-

different hues for the same color.

tint values and angle, dot gain, quality of ink, ink flow, registration, ink-printing order, and poor pressmanship have always affected traditional printing. Moving to the Mac adds problems with scanners, monitors, and imagesetters.

Pantone also has a few quirks in its specifications for screen values and printing order. For example, its original RGB values were determined on a PC with a Mitsubishi monitor, which has a different phosphor color than the Sony Trinitrons that populate the Mac world. The inks are printed in YMCK order in the Pantone Process Color Simulation



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Guide. CMYK is the traditional method of printing process colors and laying down the inks in a different order can change a color's appearance. In addition, Pantone doesn't specify any screen angles, which also affect color accuracy. The company has promised updated guides and new tools to help straighten everything out, but for now we're on our own.

What You See

Computer color travels one road to the monitor and another to the printer. Several problems contribute to the differing appearances of Pantone colors on-screen, ranging from how well a monitor is calibrated to how a company uses the licensed color values. Some developers use Pantone's RGB values as-is to display colors, while others try to improve color accuracy by reverse-engineering the RGB values from the supplied CMYK percentages. The upshot is that the same Pantone color can vary greatly in appearance from program to program (see Figure 2).

Monitors display Pantone colors differently, depending on their voltage,



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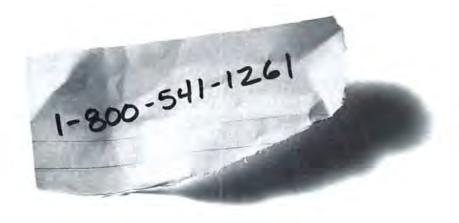
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temperature, phosphor set, and gamma curve. New color-calibration devices can help, but there is debate over how much relief they actually bring (see the "Color Calibration" sidebar in "Color Transformations" in this month's "Buyer's Guide" and "Between the Lines," March '90). Furthermore, about 10 percent of Pantone's hues are outside the color gamut that the screen can display and can only be approximated.

Programs such as Illustrator and Free-Hand, which are based on progressive colors, can also wreak havoc with Pantone colors. These programs let you adjust screen colors to match printed CMYK swatches. Unfortunately, these alterations affect all the program's color information, including the displayed values for Pantone colors. In-

stead of adjusting the progressive colors, you have to use the screen color as a rough guide and pick your final colors by using one of Pantone's printed guides.

To ensure the best color match, be sure your program uses the current implementation of Pantone's RGB values. Pantone has a corrected set of RGB values for the Sony Trinitron in its *Pantone Electronic Color Systems Licensee Manual*, which should be in the hands of developers by now. A quick call to your application's tech-support staff can confirm this.

What You Get

Printing a Pantone color is even more problematic than viewing it (see Figure 3). A major factor is whether you're using spot colors or CMYK simulations for four-color printing. Spot colors are fairly straightforward. The Pantone color area is solid black on paper or a clear section on film. The printer applies the correct ink to the plate during the final press run. Even if the color on-screen looks bad, you can always rely on the Pantone Color Formula Guide for color accuracy.

The going gets rougher if you use process colors, which means converting Pantone solid colors to their CMYK approximations in order to produce four-color film from an imagesetter. There are the usual problems with screen percentages, dot gain, resolution, screen angles,

and calibration. Pantone also has its own specifications for screen values, inks, and printing order, which may vary from those you normally use.

In 1988, Pantone released an updated Pantone Process Color Simulation Guide. Its screen-tint percentages are based on 150 lines per inch (lpi) instead of the 133 lpi of the previous guide. Increasing the line screen alters the printed color because the dot size becomes smaller.

Printing a Pantone

color is even more

problematic than

viewing it. A major

factor is whether

you're using spot

colors or CMYK

simulations for

four-color printing.

These changes mean that some programs now have outdated values for Pantone colors. To see whether a particular program is using the correct data, select a Pantone color and view it in CMYK mode. Compare its CMYK values with those in the current Pantone Process Color Simulation Guide.

For example, in the new guide, Pantone 160 (brown) is listed as 0c/60m/100y/34k. This value is correct in the latest versions of many programs, including Illustrator 88 1.9.3, QuarkXPress 2.12. FreeHand 2.01, and PageMaker Color Extension. However, previous versions of these programs may have the wrong values (QuarkXPress 2.11 uses 0c/55m/100y/30k). To be on the safe side, always check a program's screen-tint percentages against the Pantone guide when converting colors to CMYK. If they're different, use the guide to select the correct percentages.

Pantone-licensed printers, such as the ColorScript 100, have a separate set of calibrated CMYK screen tints. All the programs mentioned above produced similar results when printing Pantone 160 to the ColorScript. However, none of them matched the color shown in the Pantone Process Simulation Guide. One reason is the difference in lines per inch. The Pantone data is based on 150 lpi; printing at a lower resolution, such as 60 lpi, alters a color's appearance. In addition, the CMYK dyes used by printers such as the ColorScript may look radically different than the CMYK inks used on the printing press. Screen angling also affects color. For example, QuarkXPress uses a 45-degree screen angle to produce better color and avoid









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the distracting moiré pattern displayed by programs such as Illustrator.

Finally, the same Pantone 160 can produce still different results when printed to final film on an imagesetter. When I had a service bureau print film and measure it with a densitometer, both QuarkXPress and FreeHand came out with percentages of 0c/55m/100y/28-29k. In my case, the service bureau was printing from older versions of the programs, so make sure yours has the most current versions of your applications.

Ask the service bureau to verify the screen percentages of Pantone colors with a densitometer.

Even with the correct screen values, accurate Pantone color depends on the actual tints used for printing. If the imagesetter is not calibrated correctly, the 60-percent screen required for magenta may wind up being only

55 percent. Similarly, some programs compensate for imagesetter dot gain and others don't. Dot gain alters colors by increasing the thickness of the printed dot - turning a 10-percent screen into 12 percent, for example.

Possible Futures

Obviously, Pantone is not a panacea for your color ills, despite the marketing hype. There are simply too many variables, and Pantone is still ironing out the kinks in its computer implementations. But with the help of Radius, Pantone is taking steps to ensure that all licensees can immediately implement any changes in its color values. The two companies have developed the Pantone Precision Color Toolkit, a system resource that serves as a library for Pantone color data. Applications use the Toolkit as their single source for RGB values and CMYK screen percentages. You can update all your programs at the same time by replacing the resource. The Toolkit lets you select a monitor and display card whose particular specifications have been factored into getting the best Pantone colors on-screen. The Toolkit ships with the Radius PrecisionColor Calibrator and will be bundled with future releases of Pantone-licensed software.

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Pantone is not a

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the marketing

hype - there are

simply too many

variables.

Even with these improvements, however, critics contend that Pantone has too few colors, and that they are chosen for their popularity rather than for accurate transitions between color steps. There are matching systems based on the science of color, which has been researched for decades by standard-setters such as the International Commission on Illumination (CIE, for Commission Internationale de l'Eclairage). Because color is made up of light waves, with peaks and

> valleys (reflectance curves), researchers can plot color mathematically. Every color's curve is unique, so the values can be used to obtain accurate matches in paints, textiles, plastics, and ceramics.

> Tektronix uses CIE-based data for TekColor, its colorfidelity cdev that helps you choose screen colors that have exact matches on your

printer (see "The TekColor Solution" sidebar in "Color Transformations" in this month's "Buyer's Guide"). A newcomer to the field, Color Curve Systems (Minneapolis, Minnesota), has a set of color guides similar to Pantone's. The Color Curve System is more scientific than Pantone's, offering 2,185 graduated colors based on CIE data. It currently provides no support for CMYK simulations or Mac software, however.

As objective and scientific as these systems sound, remember that printing isn't controlled by computers and remains a subjective craft. You still need pressmen adjusting the fine flow of ink with their hands, eyes, and experience. Despite its shortcomings, Pantone has stood the test of time as a color-matching system for the printing industry. If the Pantone Precision Color Toolkit solves some of the current problems and is readily available to everyone, it may provide a similar standard for the Mac. E

Steve McKinstry is president of DPI (Digital Publishing Integration), a consulting agency in San Francisco, California. He was a pioneer in desktop color prepress technology during his tenure as design director for Macintosh Today. He lives in Anacortes, Washington.



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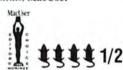
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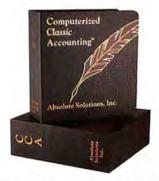
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Getting It on Film

ore and more desktop publishers are turning to service bureaus for the film used in both color and blackand-white printing. Producing high-quality film requires an attention to detail that can tax even the most seasoned PostScript service bureau. The imagesetter must be well maintained, and it must produce output that is both accurate and consistent. Even with years of experience in putting high-resolution text and graphics onto paper, a shop still might not be able to handle this kind of demanding work (although the staff may tell you differently).

By asking a few questions about the equipment and services, you can assess a service bureau's capabilities and decide whether it can satisfy your output needs. Here are some suggested questions and the answers you should receive. If the staff won't or can't answer these inquiries, it's probably not a high-quality shop.

Can you show me some samples of your work?

A professional service bureau should keep a portfolio of output samples to show potential clients. The portfolio lets you see the kinds of work it is doing and determine whether it has the type of experience you require.

What resolutions can your machines

Any shop serious about gray scale and color

How do you pick the right service bureau to handle the film for your publication? Simple — ask a few key questions.

By Keith Baumann

has imagesetters capable of printing at least 2,500 dots per inch, although you may not need such high resolution for some jobs.

Do you own a densitometer?

If the service bureau does, make sure it's used regularly. A densitometer is an optical device that generates density readings from film. Using one is the only way a service bureau can determine the accuracy and consistency of the gray values its machines produce. A densitometer can tell you when a 10-percent gray is really 12 percent. Without this essential accuracy check, you risk output that is too light or too dark and colors that are, well, wrong. (Remember, the gray levels on film determine how much ink will be used to print a particular color.) If the answer to this question is "no" or a blank stare, find another service bureau.

Do you calibrate your imagesetters regularly?

Again, the answer should be "yes." Every imagesetter is unique and requires calibration at regular intervals. First, the imagesetter must be working properly and providing consistent output. Then the operator must take densitometer readings, because there are always discrepancies between the gray values requested and what the imagesetter produces on film. After determining what the differences are, the operator can compensate for them by adjusting the transfer function of the relevant applications or printer-description files.

Do you have equipment dedicated just to film, or do you switch back and forth between paper and film?

A machine properly calibrated to work with paper must be recalibrated for accurate film work, because paper and film have different densities. If the service bureau is switching between paper and film on a single device, make sure the staff is taking the necessary precautions - such as recalibrating the imagesetter, altering its density setting, or

Figure 1: Calibration Strip 10% 60% 70% 80% 90% 100% 20% 30% 40% 50% black in the film is called its D-max and should be at least 3.8. To assess the quality of a service bureau's imagesetter, have the shop print a calibration test strip, which you can easily construct Keep track of these densitometer values, along with the date and

in Adobe Illustrator or Aldus FreeHand. Once the film has been processed, have the operator take a densitometer reading for each gray value, including 100-percent black. The density of

location of output. You can compare the results with those from other service bureaus, or print the file again later to check the consistency of a machine's output.

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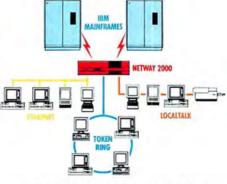
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adjusting the speed of the film processor to ensure accurate output.

What kind of film processor do you use, and is it carefully maintained?

The processors for developing imagesetter film come in two flavors: replenishing supply and recirculating. Replenishing-supply processors provide the most consistent quality, because they're always running fresh chemicals through the system. In contrast, recirculating processors yield varying results depending on the age of the chemicals, which are changed at regular intervals. Recirculating processors can still give you decent film quality, but beware of the service

> A service bureau should keep a portfolio of output samples to show potential clients. This lets you determine if it has the experience you require.

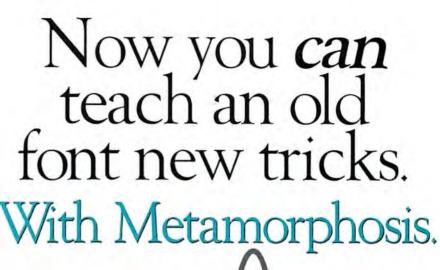
bureaus that blindly adjust speed and density controls to compensate for aging chemicals.

Do you inspect your film before sending it to the client?

Believe it or not, many shops run film and ship it off without examination. A high-quality shop first inspects all film for scratches and light leaks. With fourcolor separations, it also overlays the film layers on a light box and checks for registration problems. If you experience any of these film problems, your service bureau should rerun the job at no cost to you.

Do you own a color-proofing device?

You should always proof color film. If your service bureau can provide color proofs, you save both time and money. Low-resolution color printers such as the QMS ColorScript 100 and Tektronix Phaser CPS can generate only rough proofs for composition and color. The most accurate way to preview what you will see on the printed page is to generate a proof from the actual four-color film





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produced by the imagesetter. Laminated match prints are much more accurate for color viewing than overlay-type proofs, or color keys.

Tips for Successful Four-Color Work

· Before generating color separations at a service bureau, check with your printer. After all, the film is totally useless if it can't be printed on paper. Ask about line-screen frequencies and film sizes. Many printers require film sheets of a certain size for use with their pinregistration systems. If your film is the

If your service bureau can provide color proofs, you save time and money. **Laminated match** prints give you the most accurate color proof.

wrong size, the printer may have to recontact the imagesetter film at an additional cost to you. If your printer has never worked with imagesetter film before, provide a sample and ask for feedback. If there are problems, this is when you want them to surface, not at press time, when the costs can be prohibitive.

- · Unless you're a color-separation expert, allow yourself plenty of time for surprises. Even when you think you've covered every detail, unforeseen problems will show up, especially in deadline situations.
- · For best results, all four films for a color job should be run at one time, without breaks, to help ensure accurate registration and consistent densities among the plates.

Not every service bureau needs to meet the strict requirements for quality film output. Printing simple text and line art is not as demanding as dealing with color separations, although you should still expect a well-calibrated and maintained imagesetter. If, however, you require four-color separations, look for a quality shop and expect to pay extra for the added expertise.



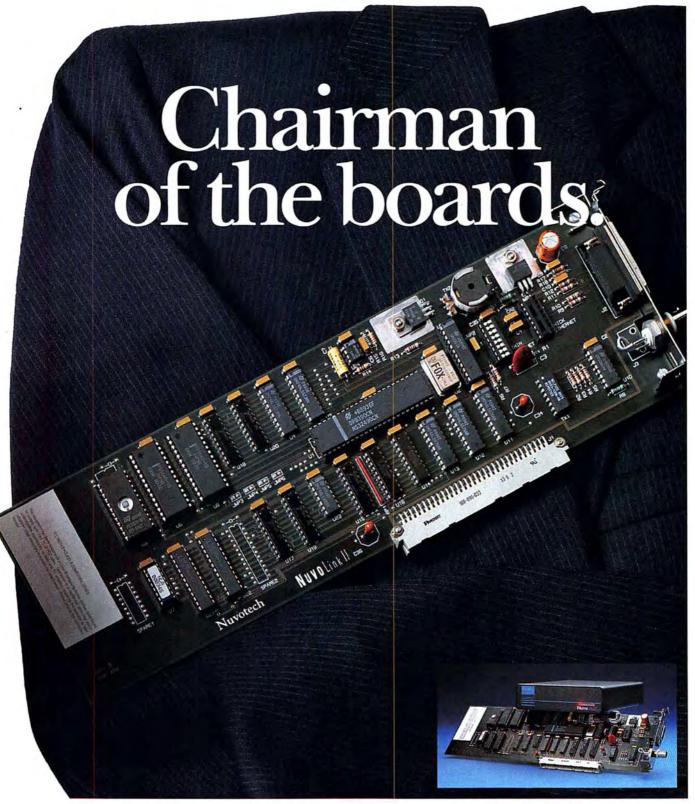
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Sharing: From Apples to Alligators

Is it UNIX or is it AppleShare? Only your Gator knows for sure. Cayman's GatorShare puts NFS servers on the Mac desktop.

ayman Systems' GatorBox is a router that lets Macs on Local-Talk networks communicate with a variety of devices on an Ethernet network. It supports Apple's EtherTalk protocols as well as the TCP/IP protocols common to UNIX machines. The GatorBox is an "intelligent" device with its own CPU and RAM. Cayman also offers downloadable software packages that enable Gator-Box to perform additional tasks. The first of these, GatorShare, is currently the only gateway product that lets Mac users access UNIX's NFS (network file system) by using standard AppleShare client software, I tested the Gator-Share-GatorBox duo in action and found that they deliver on their promise (albeit with some significant rough edges) of providing routing and NFS-to-AppleShare translation in a single self-contained device.

NFS is a distributed file system that lets networked UNIX users freely share files. NFS is implemented on top of the TCP/IP "stack" of protocols, and it is available on computers ranging from Crays to PCs.

Macintosh users and system administrators in medium-to-large-sized computer networks often must connect AppleTalk networks with TCP/IP Ethernet networks. Creating such an internetwork enables users on dissimilar networks to share files and printers and to exchange electronic mail. Be forewarned, though, that connecting TCP/IP and AppleTalk networks can be a hairy experience. If you wish to use GatorBox and GatorShare to connect to an NFS server, be sure you fully understand TCP/IP networking terms, have a detailed understanding of your current network environment, and have some experience with UNIX system administration.

The GatorBox gives Mac users access to TCP/IP services by providing a gateway between TCP/IP and AppleTalk. When loaded with GatorShare software, the GatorBox is capable of translating between AFP (AppleTalk Filing Protocol) and NFS. AFP lets you log on to and access files on an AppleShare server. Once GatorShare is installed and configured, you can access NFS servers just as if they were AppleShare servers. You don't need to install any additional software on your Mac; client software for accessing AppleShare servers comes with the Mac's system software.

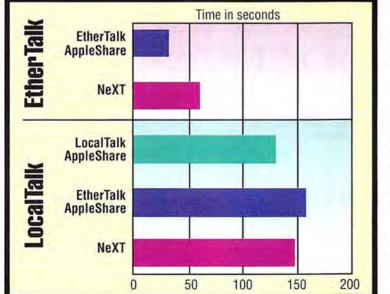


Figure 1: GatorShare translates from LocalTalk AFP to Ethernet NFS faster than the GatorBox routing software routes AFP from LocalTalk to EtherTalk.

Getting Started

If you are a new UNIX system administrator and need to learn the intricacies of TCP/IP internetworking, you'll find that both Gator-Box's and GatorShare's documentation leave much to be desired. Although the manuals state that you should already know TCP/IP and AppleTalk network administration, they don't tell you where to find more information. Despite this deficiency, a decent checklist of essential information provides a starting point.

If you're familiar with the installation of networking software and have a handle on UNIX system administration, the Cayman documentation suffices, although the step-bystep introduction is confusing and there is too

By Vernon Keenan

much repetition between the GatorBox and GatorShare manuals. The GatorShare documentation should be clearly supplementary to GatorBox's. The troubleshooting appendix is quite good, however. Overall, the documentation, combined with the diagnostic software and Cayman's helpful technical support, can help to identify most installation problems.

If you already have NFS servers on your Ethernet network, GatorShare's installation is straightforward. The GatorBox is connected to the LocalTalk and Ethernet networks, and a single Mac is designated to support the GatorBox. The GatorBox's essential software, Gator-Keeper, is stored in a folder on the administrator Mac and is automatically downloaded when the GatorBox is rebooted; the Mac must be turned on, connected to the GatorBox's LocalTalk network, and

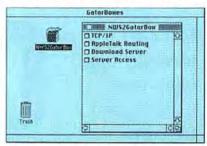


Figure 2: GatorKeeper's interface, although iconic, is not very intuitive. It's also nonstandard; the Trash appears in the window instead of on the desktop.

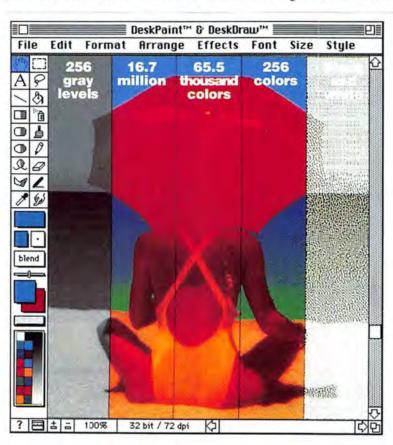
have GatorKeeper running to reboot successfully. A UNIX host can also act as a boot server for the GatorBox. This booting scheme is unfortunate, because it relies on the boot server's being available at all times. It would be better to have the software download to the GatorBox once and remain there, battery-backed, until the next software upgrade. Shiva's Ether-Gate is an excellent example of this type of approach.

The GatorKeeper software uses a nonstandard and somewhat nonintuitive iconic user interface to configure the myriad parameters needed to run Gator-Share (see Figure 2). GatorKeeper has several useful status, load-average, and diagnostic functions in addition to its configuration abilities. After you save the configuration, restart the GatorBox with the new setup. After a one-minute reboot cycle, you can verify the presence of the NFS server by checking for an AppleShare server in the Chooser.

Using GatorShare

Iused the NFS-server capabilities of a NeXT computer in the MacUser Net-WorkShop to test GatorShare. After I got the NFS server to operate, GatorShare worked as expected. I used the AppleShare icon in the Chooser to access and mount directories that were being exported by the NeXT server.

I had some initial difficulty getting NFS installed properly on the NeXT



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system. Fortunately, GatorKeeper's builtin diagnostics let me view detailed error messages that came from the NeXT. They confirmed that the basic connection was fine but that I needed to fix an export problem on the host computer.

After everything was properly installed and the NFS volume appeared on the desktop, GatorShare correctly emulated an AppleShare server, with a few pesky exceptions. GatorShare doesn't allow special Mac characters, such as TM and f, to be used in the names of files and folders. The / character is also illegal, because it's the directory pathname separator in UNIX. This can be an important limitation if you want to use the NFS server as a generic backup device. I was surprised that GatorShare didn't map the special characters into ones that could be used on the UNIX system.

Another major problem turned up when I tested GatorShare with 4th Dimension on the NFS server. As a call to Cayman later revealed, GatorShare does not support AFP's byte-range locking. Therefore, most programs that let many users simultaneously access the same files on an AppleShare server won't work. I performed several of the NetWorkShop's file-server tests, and nearly all the multiuser file-sharing tests failed. I was able to get NCSA Telnet to operate from LocalTalk through the GatorBox's TCP/ IP translation services, however.

How Fast Is a Gator?

When a Mac, an NFS server, and a GatorBox are on the same Ethernet network, only GatorShare's gateway function is used. This introduces a marginal

Report Card

GatorShare

GatorShare is software for Cayman's GatorBox router, which translates AFP to NFS and back.

Pros: Provides routing and AFP-to-NFS translation in a single, self-contained device. Unique on the market.

Cons: Requires a "boot Mac." Sluggish performance when used as a router.

Version: 1.4.1.

Requires: GatorBox router (\$2,795).

List Price: \$1,995

Cayman Systems, University Park at MIT, 26 Landsdowne St., Cambridge, MA 02139; (617) 494-1999.

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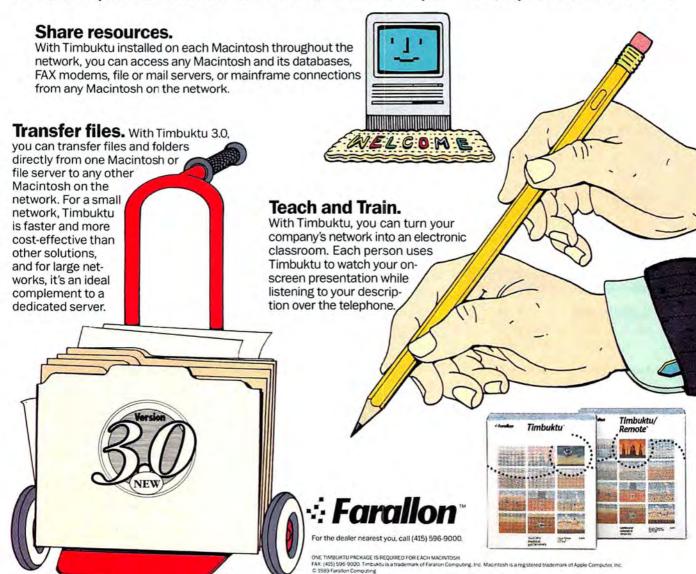
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POWER TOOLS



delay in server-client communications.

Copying a 2-megabyte file from an AppleShare server on EtherTalk to a Mac client on EtherTalk takes 31.5 seconds. It takes 61.5 seconds to copy the same file from the NeXT NFS server to the EtherTalk Macintosh client. The additional overhead comes from the Gator-Share gateway.

When a Mac on LocalTalk communicates with an NFS server on Ethernet, the story changes. If a LocalTalk Mac communicates with an NFS server on Ethernet, GatorShare's gateway (not Gator-Box's router function, as one might expect) is used. Copying a 2-megabyte file from an Ethernet NFS server to the LocalTalk Mac client via GatorShare takes 149 seconds; copying from an AppleShare server on EtherTalk via the GatorBox takes 158.5 seconds. Seemingly counterintuitive, routing between LocalTalk and EtherTalk with the Gator-Box is slower than GatorShare's translation of LocalTalk AFP to Ethernet NFS.

The speed of GatorShare depends on how you use it. For straight Ethernet work, there's roughly a 50-percent performance hit because of the translation. But you're paying for the GatorBox, whether you use its routing capability or not. If you use the routing function, don't expect to win any speed medals.

The Bottom Line

GatorShare is currently the only Local-Talk-to-Ethernet gateway product that translates the NFS file-service protocol to AFP and back again. The manual — not the greatest — is workable, especially if you're experienced with complex networking products. The diagnostic software is helpful in pinpointing problems. The filename limitation will be a problem for some users, but we found the lack of support for byte-range locking to be more significant — it means you can't use GatorShare to support multiuser Mac applications.

Many of these drawbacks will soon become moot, however. GatorShare 1.5 and GatorKeeper 1.5 should be available as you read this. The major changes to GatorShare will be full support for byte-range locking and remapping of Mac-specific characters for NFS servers. GatorKeeper will be changed to make administration easier. You will be able to designate a Mac on EtherTalk as the "boot Mac," which wasn't possible with version 1.4.1. Cayman will also supply an INIT that downloads the necessary software to the GatorBox without GatorKeeper's running on that Mac. You will also be able to designate a boot Mac on another network, making possible the administration of an internet from a single Mac.

My conclusion? GatorShare lets users mount NFS volumes just like AppleShare's, enabling them to access data on a UNIX system in a completely natural way. Nothing else currently does this, so if you want to get at NFS servers through the familiar AppleShare software interface, GatorShare is the product to buy.

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A/UX: Now We Are 2

With A/UX 2.0, Apple has finally provided us with the UNIX we've been waiting for.

NIX has long been pigeonholed as the ultimate user-unfriendly hackers-only operating system.
Apple's initial UNIX implementation, A/UX 1.x, ran on a Mac — but to a large extent, it still behaved like UNIX.

A/UX 2.0 looks like a Mac, acts like a Mac, runs Mac applications, and is a complete UNIX to boot. Apple has delivered a system that complies with all the important UNIX standards and runs Mac applications, so you get the best of both worlds.

Look and Feel

When you start it up, A/UX 2.0 looks like a Mac running MultiFinder. The Finder's desktop shows up, the Apple menu and other standard menus appear, as do both Mac and UNIX volumes. Unless you look carefully, you can easily mistake an A/UX 2.0 system for a "normal" Mac. You can launch Mac and UNIX applications and switch between them as easily as you would under MultiFinder. You can even select printers and AppleShare servers from the Chooser. Mac applications run under A/UX 2.0

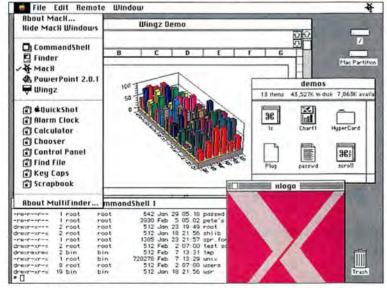


Figure 1: Mac, UNIX, and X Window applications coexist happily in the A/UX 2.0 MultiFinder.

with no perceptible performance loss. The integration of UNIX and the Macintosh interface is impeccable.

A/UX 2.0's "emulation" of the native Mac operating system is based on System 6, but it already has a few System 7 features. The A/UX MultiFinder offers Set Aside (the ability to make all the windows and dialog boxes associated with an application disappear), and it uses the Desktop Manager to manage Finder icons for applications and documents. All Mac software that is to run under System 7 must be "32-bit clean," which goes for A/UX 2.0 as well. But, in contrast to the initial A/UX, this A/UX lets you run almost any Mac software that is 32-bit clean, including INITs and cdevs. You won't have to give up your favorite Mac enhancers under A/UX 2.0.

Three Windows and a Desktop

With the new version of A/UX, you can run three distinctly different types of applications simultaneously (see Figure 1): vanilla-UNIX applications, Mac applications, and X Window applications (if you have the X Window system for A/UX, you'll need an add-on for A/UX 2.0). So-called hybrid applications — UNIX applications that make Mac Toolbox calls — will also become available. Brown University's Intermedia is such an application.

You can copy and paste text among these different types of applications. There's no support in A/UX for cutting and pasting bit maps or PICT files, but with a Mac screencapture utility, you should theoretically also be able to cut graphics from UNIX and X Window applications and paste them into a Mac app.

The integration of UNIX into the Mac paradigm is very good, but for some tasks, the "normal" text-oriented way is the only way to get something done. Happily, A/UX comes with all the standard UNIX utilities. Three different shells (Bourne, Korn, and C) are available, as are the numerous standard UNIX text-editing environments. But for those who like to be as Mac as possible, A/UX 2.0 offers nicer alternatives. TextEditor is a Mac editor based on the MPW (Macintosh Programmer's Workshop) editor and can be used instead of vi (or any other UNIX editor).

More importantly, though, the many UNIX utilities have a friendlier facade with A/UX 2.0. Another MPW spin-off, Commando, lets users build UNIX command lines by selecting familiar check boxes and radio buttons. Each UNIX utility has its own custom Commando interface. Once you've made all your selections, Commando creates a syntactically correct command line and passes it to the UNIX shell. Commando is a great solution for users who want the powerful features that many



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UNIX utilities offer but don't use them often enough to warrant learning the esoteric syntax.

Another example of the seamlessness of A/UX 2.0's environment is its handling of different file systems. Mac HFS volumes show up on the A/UX Finder desktop as do AT&T and BSD UNIX file systems. All the different UNIX file types now have their own icons in the A/UX Finder. Mac floppies appear on the desktop like any other volume. Apple File Exchange can run under A/UX 2.0 to support DOS file transfer, and with Dayna's DOS Mounter INIT, you can mount four file systems on your A/UX 2.0 desktop and move files among them transparently.

And It's Really UNIX

All this talk of a nicer user interface and seamless Mac integration might lead to the conclusion that compromises were made on the UNIX side. Not so. A/UX 2.0 is based on AT&T's System V, Release 2, Version 2. It incorporates BSD 4.3 extensions and is POSIX-compliant. Applications that run in these standard environments can be ported with ease to A/UX, because the necessary development tools are included.

Two other A/UX 2.0 features include NFS 3.2, for remote file sharing, and Berkeley Network Services, which provides remote log-in, execution of UNIX applications, and E-mail. A/UX cancommunicate over either LocalTalk or EtherTalk. TCP/IP is also supported, over either Ethernet (the same card can be used for EtherTalk) or over serial lines with SL/IP.

Several applications, both Macintosh and UNIX, are proven performers under A/UX 2.0. Word 4.0, Excel 2.2, Wingz, and More II all run. IPT's uShare, an AFP server that runs on UNIX systems, works as well, offering another way to share files with non-A/UX Macs.

A/UX 2.0 will be available from A/UX-authorized dealers by midyear. For the first time, A/UX will be distributed on a CD-ROM disc, along with the necessary floppies to install it onto a hard disk. It will also come as a system bundle with several different CPUs, on an 80-megabyte hard disk, or on a 40-megabyte QIC-100 tape.

A/UX 2.0 is a tremendous leap forward — at last, Apple has provided us with the UNIX we've been waiting for.

— Stephan Somogyi

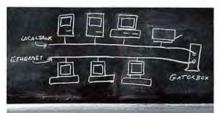
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Performs AppleTalk routing		- 1	
Supports TCP/IP			
Runs software for Mac-to-UNIX file sharing			
Supports AppleShare for VMS and UNIX	- 1		
Supports remote login to UNIX from Macs			
Compatible with GatorMail			
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Memory (RAM)	1MB DRAM	256K SRAM	192K DRAM
Retail price	\$2795	\$2795	\$2395

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most. Payroll tax labels can't be modified, which forces you to subscribe to Bedford's yearly update service. Version 1.03. Requires 1 megabyte. S349. (Version 1.05 now available) Bedford Software, 15311 N.E. 90th St., Redmond, WA 98052. (206) 883-0074. NCP (Sept '88)

Timeslips III \$\$\$\%\ tracks billing and expense information for people who charge by the hour. DA turns the clock on and automatically bills a client

when a session is over. Version 1.06. Requires 512K and two disk drives. Mac II and MultiFinder triendly. \$199.95. (Version 1.1 now available for \$299.95) North Edge, 239 Western Ave., Essex, MA 01929. (508) 768-7490. NCP (Sept '88) ★ '88 Eddy

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Accu-Weather Forecaster 1111
is a combination communications and meteorological-dataanalysis program. Gives access to hourly National Weather Service station reports. Simple maps and charts let you view weather data graphically. Telecommunication mode is optimized to reduce connect-time costs. Version 1.05. Requires 1 megabyte; one 800K drive and a 300-, 1,200-, or 2,400-baud Hayes-compatible modern. \$89.95; Accu-Weather Connect Fee, \$39.95; educational and commercial connect rates higher. Metacomet Software, P.O. Box 31337, Hartford, CT 06103. (203) 223-5911.

Apple File Exchange (AFE) tttt is one of the utilities that comes free with the Mac System. AFE offers a simple interface and works with a wide variety of datatransfer methods. Its best feature is that it works with current and future MacLinkPlus translators. By itself, its translators are limited to MacWrite generictext. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Oct '89)

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Apple PC 5.25 \$\frac{1}{2}\fr your Mac. Requires Mac SE or NuBus slot. Drive, \$399; board, \$129. Apple Computer. 20525 Mariani Ave., Cupertino, CA 95014. (Oct '89)

AppleShare \$155
is the file sharer marketed by Apple. Software-based. AppleShare requires you to dedicate a Mac and a hard disk to run it. Allows users on the network to protect things from other users on the folder level. Interface to network is provided at a revised Finder. 8799. (Now available: AppleShare Print Server, Version 2.0, \$299; AppleShare PC, Version 2.0, \$149.) Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. NCP (May '87)

ComServe tttt allows you to share a Hayes-compatible modern over an AppleTalk network. You can call out, but you can't call in. Works with met telecommunications packages. \$195 per server. Infosphere, 4730.S.W. Macadam Ave., Portland, CR 97201. (503) 226-1407. CP (Feb '88)

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Desktop Express \$\frac{15}{15}\%
is a simple-to-use, semiautomated program for using MCI Mail and Dow Jones News/Retrieval. Performance is traded off for ease of use. Requires 512K. \$149, Dow Jones & Company, P.O. Box 300, Princeton, NJ 08543-0300. (609) 452-7040. NCP

LapLink Mac \$\$\$\$
is a file-translation package that runs on the PC and connects to
the Mac via a serial cable. Not a bad program as lar as DOS goes,
but this version has some quirks. The PC-to-Mac translators concentrate on word processors, but there aren't nearly as many as in MacLinkPlus. Version 2.0. \$139.95. Traveling Software, 19310 N. Creek Parkway, Bothell, WA 98011. (Oct '89)

Liaison tttt

is a software-based Apple Talk bridge for connecting two Local Talk networks or a Local Talk and an Ether Talk network. Using Liaison with standard moderns, a single user can connect remotely to an with standard modems, a single user can connect remotely to an AppleTalk network, or two networks can be connected to form a wide-area network. Serialized. Version 1.0. \$295. (Version 2.0 now available) infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201. (503) 226-1407. NCP (April '89)

MacLinkPlus/PC \$\$\$\$\$
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than does any other application. Interface is friendly, and translations are clean. In addition to translating locally or over a network, the package can connect to a PC serially and via modern. Translators alsowork with Apple File Exchange. Version 3.05. MacLinkPlus/PC. \$195 (with telecommunications): MacLinkPlus/Translators, \$159 (desktop version only); MacLinkPlus/WangVS and MacLinkPlus/WangOIS, \$395 to \$995. DataViz, 35 Corporate Drive, Trumbull, CT 06611.

MacWorkStation tttt

is a development environment and communications program that accesses custom mainframe applications through the Macintosh interface. Modular design allows for expandability. Mac II and MulliFinder Iriendly, Version 3.0, \$2,500 for internal use license; \$5,000 for commercial use license. (\$100 single use license now available) Apple Software Licensing, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. NCP

MicroPhone II \$\$\$\$\%\text{1}\$ is a high-powered terminal program that's easy enough for novices. Verypowerful command language allows full automation of communications if desired. \$295. (Version 2.0 now available) Software Ventures, 2907 Clarement Ave., Suite 220, Berkeley,

CA 94705. (415) 644-3232. NCP (Jan 89) *86 Eddy

NetWare for Macintosh \$\$\frac{1}{2}\$\$ allows Macs on LocalTalk or Ethernel networks to connect to a NetWare file server using AppleShare client software. Difficult Netware the server using Applieshate chem, somware, Dinition PC-based setup and administration. Not recommended for Mac-only networks. For those with non-AppleTalk PC networks already attached to NetWare servers; 4 mice. Requires 80286- or 80386-based PC for server, PC for administration. PC LocalTalk card, two PC Ethernet cards, NetWare version 2.15 or later, and AppleShare client software. \$200. (Version 3.15 now available) Novell, 122 E. 1700 S., Provo, UT 84606. (800) 526-5463. NCP pc MACTERM/pcANYWHERE III \$555
pc MACTERM/pcANYWHERE III \$555

are two programs that work together to take control of an MS-DOS machine from the Mac keyboard. Versions: pc MACTERM DOS machine from the Mac keyboard, Versions: pc MAC LERM 1.1; pcANYWHERE III 3.0. Requires 512K; System 4.1 or later; 128K IBM PC-compatible and MS-DOS 2.1 or later, pc MACTERM, \$99; pcANYWHERE III, \$145. Dynamic Microprocessor Associates, 60 E. 42nd St., Suite 1100, New York, NY 10165, (212) 687-7115, NCP (Jan '89)

QuickShare 2.0 \$55% connects your Macto a PC using SCSI, enabling a Macto access files on a PC or PC network. Also gives the Mac disk space on the PCs, which can be mounted on the Mac's desktop and used as Mac disks. File-transfer software provides generic text and graphic translations. Requires DOS 3.0 or later. \$465. Compatible Systems, P.O. Drawer 17220, 2900 Center Green Court S., Boulder, CO 80308. (Oct '89)

Rapport/Drive 2.4 \$\$\$\footnote{1}\$: is a connector/drive combination. When the Rapport connector is attached to the external-disk-drive port of a Mac Plus or SE, it allows MS-DOS 3.5-inch disks to be inserted into the Mac's internal drive and read through Apple File Exchange. Drive 2.4 is an 800K external drive that can be used in conjunction with Rapport. Rapport, \$295; Drive 2.4, \$495. Kennect Technology, 120 A Albright Way, Los Gatos, CA 95030. (800) 552-1232 or (408) 370-2866. NCP (July '89)

Red Ryder ttttt

is a full-leatured telecommunications program that supports MacBinary, Xmodern, and Kermit. Has big-screen support, auto-procedure creator, and up to 30 keyboard macros. Version 10.3 reviewed. \$80. The FreeSoft Company, 150 Hickory Drive, Beaver Falls, PA 15010, (412) 846-2700. NCP (Jan '89) ★'87 Eddy

* 87 Edgy

Smartcom II \$\$\$\$\$
balances power and ease of use. Capable of unattended operation and has a powerful command language. The fastest screen updating available can keep up even at 9,600 baud. The largescreen buffer can easily be archived. Version 3.0 reviewed, \$149. Hayes Microcomputer Products, P.O. Box 105203, Atlanta, GA 30348. (404) 441-1617. NCP (Jan '89) *85 Eddy

SoftPC 111/2 puts an IBM PC XT inside your Mac without cracking the case to add any special coprocessor boards. The emulation of an MSand any special cogniticssor loads, file emulation of an MS-DOS machine is done entirely in the software. Version 1.2. Requires Mac II or SE equipped with 68020 accelerator card and 2 megabytes of RAM. \$595. (Version 1.3 now available for \$399). Insignia. Solutions, 254. San. Geronimo. Way, Sunnyvale, CA. 94086. (408) 522-7600. NCP (Nov. 88).

TOPS titt

is a file server designed to network computers with different operating systems. Supports Macs, MS-DOS compatibles, and UNIX. Access to files and subdirectories is transparent to the user; they appear as Mac folders. Only handles ASCII or Text files. \$249 for Mac version. (Version 2.1 now available) TOPS,

tiles. \$249 for Mac version. (Version 2.1 now available) TOPS, 950 Marina Village Parkway, Alameda, CA 94501. (800) 445–8677. Serial number protected. (May 87) ★ 87 Eddy VersaTerm-PRO \$\frac{1}{2}\

DATABASES

DAtabase \$\$\$\$\\^{\text{this manager}} in a DA. Handles pictures, text, and numbers with ease. Supports color, Converts QuickDEX and other files. Version 1.12. Requires 512K or later, \$129.95. Preferred Publishers, 5100 Poplar Ave., Suite 706, Memphis, TN 38137. (Nov '89)

dBASE Mac \$\$\$\$ is a relational DBMS that includes a structured programming

language to develop stand-alone applications. Palette icons as alternatives to menu commands will help novice users. Requires 1 metabyte, \$495. (Version, 1.01 now available). Ashton-Tate. 6411 Guadalupe Mines Rd., South San Jose, CA 95120. (213) 327-1111. NCP (Feb '88)

Double Helix II \$\$\$\$\%\ is a powerful database that supports a multiuser environment with an upgrade, Uses an icon-based development system for easy creation of databases. \$595, single-user version. (Version 3 now available) Odesta, 4084 Commercial Ave., Northbrook, IL 60062. (800) 323-5423. NCP (Apr '88)

EndNote tttt

provides database management for bibliographies. Designed to work in conjunction with a word processor. Allows for formatted in-text citations to be pasted directly into a word-processing document and then creates a bibliography from the citations Version 1.0. \$129. (Version 1.2.1 now available) Associates, 2000 Hearst St., Berkeley, CA 94709. (415) 655-6666. NCP (Feb '89)

Microsoft File \$55 is an OK llat-file manager. Biggest strength is its more than 100 forms templates that work with standard preprinted business forms. Version 2.0. Requires Mac 512KE. \$195. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717. (Nov '89)

FileMaker II \$\$\$\$\%
is a solid development-onented multiuser flat-file manager, ideal for business environments. Has flexible layouts, hierarchical menus, and good searching and reporting capabilities. Supports color, Version 1.0. Requires Mac Plus and two 800K drives or a hard-disk drive. \$299. Claris, 5201 Patrick Henry Drive, Santa Clara, CA 95052-8168. (Nov '89)

Filevision IV \$t\$ is a picture-oriented flat-file manager. The application of choice for graphics-text integration projects. Doesn't stack up well in straight-fext uses. Version 1.0. Requires Mac Plus. \$495. Marvelin, 3420 Ocean Park Blvd., Suite 3020, Santa Monica, CA 90405 (Nov '89)

4th DIMENSION \$55% is a versatile tool that creates stand-alone relational databases. Designand layout environments alloweasy linking of information Robust, Pascal-like procedure language, \$695. (Version 1.0.6 now available) ACIUS, 10351 Bubb Rd., Cuperlino, CA 95014. (408) 252-4444, ext. 5. NCP (Nov '87) ★'87 Eddy

FoxBASE+/Mac ttt;

foxBASE+/Mac ttt;

is a relational database that can read unmodified dBASE III PLUS
applications created in the MS-DOS world. Amazingly fast. Good
implementation of dBASE on the Mac. Version 1.0. Requires 1 megabyte. Mac II and MultiFinder triendly. \$395. (Version 2.0 oncw available for \$495. Multiple user: \$695.) Fox Software, 134 W. South Boundary, Perrysburg, OH 43551. (419) 874-0162. NCP (Sept '88) ★ 88 Eddy

MBA Series tttt

is a set of 11 multiuser business applications that run under ACIUS' 4th Dimension. It's also an automated programming environment for developing additional 4th Dimension applications. Requires 1 megabyte and 4th Dimension. \$189 per application, unlimited users. Generation Four, 3232 San Mateo N.E., #199, Albuquerque, NM 87110. (505) 294-3210. NCP

Omnis 5 tttt

is Blyth's major upgrade of Omnis. Primarily a developer's tool, it's a powerful, graphics-oriented, multiuser relational/hierarchical database. Improved interface still isn't entirely Mac-like. Comes with HyperCard externals for creating HyperCard front ends Version 1.0. Requires Mac Plus or later and hard drive. \$695 Blyth Software, 2929 Campus Drive, Suite 425, San Mateo, CA 94403. (800) 843-8615 or (800) 223-8050 CA, NCP (Sept 89)

Oracle for Macintosh tttt

is more a development tool kit than an end-user product and makes possible the creation of Macintosh front-end applications that access Oracle databases on mainframes and minis. Includes HyperCard XCMDs, Version 1.0, Single-user, \$199; network version, \$999. (Version 1.1 now available: Single-user, \$299) Oracle, 20 Davis Drive, Belmont, CA 94002. (800) 345-3267. NCP (June '89)

Panorama \$155 replaces the flat-file manager OverVUE. Keeps databases in RAM for speed. Spreadsheetlike data entry. Supports text, numbers, graphics, and dates as data types. Also offers color support. powerful charting function, and macros. Version 1.1.1. Requires Mac Plus. \$395. ProVUE Development, 15180 Transistor Lane. Huntington Beach, CA 92649. (Nov '89)

Pro-Cite ttt

is a complete database-management system for bibliographies Almost unlimited flexibility in the formatting of bibliographies Full-featured search and sort capabilities. Version 1.3. Requires 512KE \$395. Personal Bibliographic Software, P.O. Box 4250, Ann Arbor, MI 48106. (313) 996-1580. NCP (Feb '89)

RecordHolderPlus \$\$\$\$
is a middle-of-the-road flat-file manager with average functionality. Has the best edit functions on the market. Good choice for a high-volume application in which editing can make all the difference. Version 3.1. Requires 512K, \$99.95. Software Discoveries, 137 Krawski Drive, South Windsor, CT 06074 (Nov '89)

Reflex Plus: The Database Manager

is a relational database with "smart" entry and report design but

no overall programming facility. Simple to set up, yet fast, Graphic capabilities are quite limited. Version 1.0. \$279. (Version 1.01 now available) Borland International, 1800 Green Hills Rd., Scotts Valley, CA 95066, (800) 345-2888, NCP (Feb. 88)

Retriever ttt

is a spreadsheet-oriented DA flat-file manager that has solid reporting and uses icons instead of menus for many functions. Has fast sorting capability, decent searching capability, and HyperCard interface. Version 1.03. Requires 512K, \$89.95. Exodus Software, 8620 Winton Road, Suite 304, Cincinnati, OH 45231 (Nov '89)

DESKTOP PUBLISHING

DTP Advisor \$\$\$
combines a HyperCard-based tutorial on publishing with a project-management system. Beautifully designed but better of as a book. Version 1.0. Requires 1 megabyte and HyperCard 1.2. \$79.95. Broderbund Sollware, 17 Paul Drive, San Rafael, CA 94903-2101. (415) 492-3200. NCP (Apr '89)

Fast Forms ttt

is a forms-design and -management program that uses a DA for forms fill-out. It has only basic calculation ability and a limited design environment. Confusing interface, Version 1.2.1. Requires Mac 512KE, System 3.2, and Finder 5.3. \$149.95. Power Up! Software Corp., 2929 Campus Drive, San Mateo, CA 94403.

FlexForm Business Templates tttt

are two volumes of prepackaged business forms SmartForm Assistant. Volume I contains stockkeeping. production, sales, billing, and collection; Volume II has purchasing, receiving, accounting, disbursing, and personnel, \$89.95 per volume. Antic Software, 544 Second St., San Francisco, CA 94107. (Jan '90)

FontLiner tttt

converts Fontographer-created typefaces into PostScript outline fonts that can be edited in Illustrator and FreeHand. Version 1.0 Requires 1 megabyte. \$129.95. Taylored Graphics, P.O. Box 1900, Freedom, CA 95019. (408) 761-2481. NCP (July '89)

FormSet \$155 is a collection of 65 business forms, including job estimates earning statements, credit memo, time cards, and more, that can be customized with company name and logo. A fill-out program includes date stamping, field calculation, and so on. \$99. SoftView, 1721 Pacific Ave., Suite 100, Oxnard, CA 93033.

Interleaf Publisher \$\frac{4\fmathbf{t}}{2\fmathbf{t}}\text{/s} is a speedy multiuser layout system for producing large, complicated documents. Version 3.5 has an improved user interface, but it still suffers from poor font management. Requires Mac II with 5 megabytes of RAM and hard disk. \$995. Interleaf. 10 Canal Park, Cambridge, MA 02141, (617) 577-9800 NCP

KeyCap Fonts tttt

contains three typefaces designed specifically for writing computer documentation. Version 1.0, \$149.95. Paperback Software International, 2830 Ninth St., Berkeley, CA 94710. (415) 644-2116. NCP (June '89)

KeyMaster-The Art Importer tttt

creates PostScript fonts containing up to 16 graphic characters. Accepts logos, clip art, and other PICT and EPSF graphics. As graphics can be used in programs that don't normally accept them, and resizing is as assy as changing the point size. Version 1.0. Requires 1 megabyte, \$99.95. Altsys Corp., 720 Avenue F, Suite 109, Plano, TX 75074. (214) 424-4888. NCP

LetrTuck ttt

lets you add, delete, or modify the kern pairs for any installed font. Version 1.04. Requires 512KE or later, \$149. (Version 2.0 now available for \$99) EDCO Services, 12410 N. Dale Mabry Highway, Tampa, FL 33618. (800) 523-8973. NCP (June '89)

MacTeX 111%

the TeX environment of choice for hard-core TeX users on the Macintosh, Very intimidating for others, Painfully slow and visually unattractive. Version 2.0, Requires 1 megabyte, \$750. FTL Systems, 234 Eglington Ave. E., Toronto, Ontario, Canada M4P 1K5, NCP (Apr '88)

PageMaker tttt

gives designers complete freedom over page layout. Uses pasteboard metaphor, All placement of text and graphics relies on hand-eye coordination. Color Extension add-on lets you edit a color image's CMYK values. Can't do tour-color separations. Easy to learn. Version 3.02CE. Requires Mac Plus and a harddisk drive. \$595. Aldus, 411 First Ave. S., Seattle, WA 98104-2871. (Jan '90) 3'85, '87, ★'88 Eddy

PageMaker Portfolio: Designs for Newsletters 1111 provides 21 templates for newsletters with preset columns.

headlines, graphics, and captions. Documentation provides excellent futorial in page design. Requires 512KE or later and PageMaker. \$99. Aldus, 411 First Ave. S., Seattle, WA 98104-2871, (206) 628-2375. NCP (May '87)

PhotoMac \$\$\$\$ is a powerful color-retouching tool for photographs in PICT and TIFF. Displays and edits in 8-bit mode; saves in 8- or 24-bit modes. Makes color separations but process requires substantial disk space. Version 1.0, Requires Mac II with 2 megabytes, color monitor, and 8-bit video card; hard disk with more than 2 available megabytes \$695, Avalon Development Group, 1000 Massachusetts Ave., Cambridge, MA 02138, (800) 522-0265 or (508) 481-3700, ext. 649 in MA. NCP (July '89) **Publish It! 153**

is a moderately priced page-layout package designed for users with Pluses and SEs. Includes word-processing and simple drawing and painting tools. Works using a frame metaphor. Can rotate text. Limited color support. Version 1.1. Requires Mac 512KE, System 4.2 or later (System 6.0 or later preferred), and 800K drive; hard-disk drive recommended, \$395. Timeworks, 444 Lake Cook Road, Deerfield, IL 60015-4919. (Dec '89)

Publishing Packs \$15% bundle together three Adobe typefaces that work well for a particular publishing project. The packages offer substantial savings over purchasing the typefaces individually, and the documentation has useful information on typeface characteristics. Newsletters, \$395; Forms and Schedules, \$475; Presentations. \$475. Adobe Systems, Inc., 1585 Charleston Road, Box 7900, Mountain View, CA 94039-7900. (800) 447-3577. NCP

QuarkStyle \$115 a collection of 72 designer-created templates for "instant" desktop publishing. The templates, which cover the gamut from business cards to newsletters, let you concentrate on a page's contents rather than its appearance. Version 1.0, Requires 1 megabyte and hard disk. \$295. Quark 300 S. Jackson St., Suite Denver, CO 80209. (800) 543-7711. NCP (Feb '89)

QuarkXPress tttt

is a powerful page-layout program with 24-bit color, style sheets, and search-and-replace on lext attributes. Also does four-color separations. Page layout is handled through text and graphics boxes that add precision to layout but are difficult to master. Version 2.12 Requires Mac Plus and hard-disk drive. \$795. Quark, 300 S. Jackson St., Suite 100, Denver, CO 80209.

CP until registered. (Jan 90)

Ready,Set,Go! \$\$\$\$\$\$\frac{1}{2}\$\$\$\$\$\$\$\$\$ combines an elegant interface with style sheets, fine-tuned typography, gray-scale editing, and spot color. The only program to provide thumbnail views of publications that allow for rearrangement of pages. It's also one of the first programs to store font information with documents, thus avoiding font ID conflicts. Version 4.5a. Requires Mac Plus and a hard-disk drive, \$495. Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653.

SmartForm Designer tttt

is a full-featured forms-design and -management program, Includes SmartForm Assistant for forms fill-out and handling. Fasy-to-use design environment. Imports color graphics Requires Mac Plus and two 800K drives or a hard-disk drive. Version 1.1, \$399. Claris, 5201 Patrick Henry Drive, Santa Clara, CA 95052-8168 (Jan '90)

Springboard Publisher ttt

combines page layout, word processing, and graphics capabil ties in one easy-to-learn program. Too limited for serious desktop publishing but cost-effective for simple documents. Version 1.06. Requires 1 megabyte \$199.95. Springboard Software, 7808 Creekridge Circle, Minneapolis, MN 55435. (800) 445-4780. NCP (May '89)

TableTools ttt

is a dedicated table-creation package. Lets you create complex tables for importing into page-layout programs. Powerful features, but poor memory management, slow speed, and modal operation make it a hassle to use. Acceptable for in-house DTP creation of nake it a nassie to use. Acceptable for int-house UTP Creation of complex tables, but for simple jobs Word 4.0 is easier to use. Version 1.0. Requires Mac Plus and System 6.0.2; hard drive recommended. \$395. Mansfield Systems, 550 Hamilton Ave., Suite 150, Palo Alto, CA 94301. (415) 326-0603. NCP (Sept 89)

Textures ttt

is an implementation of TeX, the big daddy of typesetting programs. Good for people trained on mainframes in the early days. Otherwise very sticky with a high learning curve. Version 1.0. Requires Mac Plus, \$495. (Version 1.01F now available for \$495, \$395 education) Blue Sky Research, 534 S.W. Third Ave., Portland, OR 97204. (800) 622-8398. NCP (Apr '88)

TrueForm tttt

creates an electronic form by scanning a preexisting paper one or importing from another design environment. No design capabilities. Automatic field definition. Form caching for faster printing. The only forms package with a database link. Version. 2.0. Requires Mac Plus, two 800K disk drives or a hard-disk drive, and System 6.0 or faler. \$395. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900. (Jan '90)

UltraSpec \$\$

performs copy-fitting chores such as calculating copy length, creating dummy pages, and producing printer specs. Version 1.0. Requires HyperCard and 1 megabyte. \$149.95. SoftStream, 19 White Chapel Drive, Mount Laurel, NJ 08054. (800) 262-6610. NCP (June '89)

GRAPHICS & DESIGN

Aldus FreeHand 2.0 tttt/

is a major upgrade. Greatly increased power includes up to 100 levels of undo, auto-trace, a blend command for interpolating shapes and colors, and expanded text manipulation. Has a steep learning curve but is relatively easy to use once you've got the hang of it. Version 2.0. Requires 1 megabyte, \$495. Aldus, 411 First Ave. S., Seattle, WA 98104-2871. (206) 628-2375. NCP

MiniFinders

ArtClips ttt

is a peculiar collection of EPSF "art work." Requires 1 megabyte. \$99. Tactic Software, 13615 South Dixie, Miami, FL 33176. (305) 378-4110. NCP (Aug '89)

Canvas 2.0 ttttt

is a rich drawing/painting program, leaturing full Bezier curves, cutting and joining of polygons, skewing, perspective and distortion, auto-dimensioning, area and perimeter calculation, auto-tracing of bit maps, and full color support. Creates and edits auto-trasing of off maps, and full color support. Creates and edits high-resolution bit maps to 2,540 dpi. Slightly less powerful DA version available. Requires 1 megabyte, two 800K floppies, and System 6.0. \$299. Deneba Software. 3305 N.W. 74th Ave., Miami, FL 33122. (305) 594-6965. NCP (Apr '89)

Click & Clip \$33 offers seasonal graphics packages. Of the two quarterly editions released, the spring '88 package is the better collection. Requires a program that reads Encapsulated PostScript Format (EPSF) files. \$39.95 per edition. (Now available: C&C 500. \$395; C&C Military Arts, Version 1.1. \$149) Studio Advertising Art, 4305 E. Sahara, Suite 1, Las Vegas, NV 89104. (702) 641-7041. NCP

Clip3D tttt is a line of 3-D, color-clip-art collections bundled with a powerful editing program. Images are in Pro3D format and provide exceptional output quality. On a Mac II. DAs don't work white Clip3D is active Version 1.0. Requires 1 megabyte. \$99 per package, including Clip3D editor, Enabling Technologies, 600 Dearborn, Suite 1304, Chicago, IL 60605. (312) 427-0408. NCP (Aug '89)

Cliptures tttt

is a series of business-oriented EPSF clip art. Volume 2, Business Images, is the best collection and can be cataloged with Curator. Requires 1 megabyte. \$129.95. Dream Maker Software, 4020 Paige St., Los Angeles, CA 90031, (800) 876-5665, NCP

Collector's Edition I tttt

contains a useful assortment of dingbats, borders, and two editable alphabets, all saved in Illustrator format. Requires 1 megabyte. \$125. (New edition now available for \$225) Adobe Systems, 1585 Charleston Road, P.O. Eox 7900, Mountain View, CA 94039-7900. (800) 447-3577, NCP (Aug '89)

Cricket Color Paint \$51% is an 8-bit color paint program that relains Cricket Paint's FreshPaint leature and has only a few new tools. If you're looking for an 8-bit color program, stick with Carvas 2.0 or studio/8.
Version 1.0. Requires Mac II or later, 2 megabytes, and System 6.0 or later. \$295. Computer Associates, 10505 Sorrento Valley Road. San Diego, CA 92121-1698.

CA-Cricket Draw \$55% is an object-oriented drawing program that will produce stunning, high-quality output. Designed to print on PostScript-compatible s such as the LaserWriter. \$295. Computer Associates 10505 Sorrento Valley Road, San Diego, CA 92121-1698. (215) 889-1990. NCP (May '87)

CA-Cricket Presents tttt

is a presentation tool with strong emphasis on graphics. Good master template. Lacks import capability for text. Version 1.0. Requires System 42 or later. 5695. Computer Associates, 10505 Sorrento Valley Road, San Diego, CA 92121-1698. (215) 889-1990. NCP (Dec '88)

CA-Cricket Paint ttt/

is a monochrome paint program with a few interesting tools but not enough to make it first choice in its price range. FreshPaint gives it the best of both object-oriented and bit-mapped applications. Supports resolutions up to 300 dpi. Version 1.0. Requires Mac Plus or later and System 6.0 or later, \$195. Computer Associates, 10505 Sorrento Valley Road, San Diego, CA 92121-1698. (Oct '89)

Crystal Paint 1111 creates an electronic kaleidoscope. It is MacPaint's Brush Mirrors gone wild in a small, simple, yet wonderful application. Does not work in color on Mac II. MultiFinder friendly. Requires 512K. \$49.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley. CA 95066. (408) 438-1990. NCP IFeb '88)

The Curator 1111

catalogs your art and graphics so it's easy to see what's what and where it is. Supports PICT, TIFF, EPSF, PostScript, MacPaint, and more. Changes creator types. Requires 512K and an 800K drive. \$139.95. (Version 1.05 now available) Solutions International, 30 Commerce St., Williston, VT 05495, (802) 658-5506. NCP (Sept '88)

DeskPaint & DeskDraw tttt

is a set of DA graphics utilities. DeskPaint handles bit-mapped files, whereas DeskDraw handles PICTs. Somewhat busyinterface due to be upgraded in early 1990. Very useful tools for desktop publishers. DeskPaint requires 512K; DeskDraw requires 5,0 or later. \$129.95. DeskPaint, version 2.01C; DeskDraw, version 1.3. Zedcor, 4500 E. Speedway, #22, Tucson, AZ 85712.

Digit-Art tttt

is an overwhelming collection of EPSF clip art available on disk and CD-ROM. Comes with a well-designed catalog of images. Requires a program that reads EPSF files. \$99. (Fifteen volumes now available for \$99 to \$149) Image Club Graphics, 1902 11th St. S.E., Calgary, Alberta, Canada 12G 362. (800) 661-9410. NCP (Aug '88)

Drawing Table tt% is a low-priced alternative to MacDraw II that has some nice tools, but its clumsy selection interface makes it frustrating to use. Comes with separate libraries of object oriented clip art, including arrows, landscaping, and chart symbols. Can import paint, PICT, and EPSF art. Version 1.0. Requires Mac Plus or later, two 800K drives, and System 4.1 or later. \$129. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101. (Nov '89)

DynaPerspective 1111

is a good 3-D architectural-modeling program ported from DOS, Can create perspective drawings and elevations automatically from a floor plan. Objects can be made translucent, so windows and water effects are possible. It can also produce animations that "fly" you around buildings and in and out of rooms. Version 1.0. Requires Mac II or later. \$1,495. (Version 1.2 now available) Dynaware, 1163 Chess Drive, Suite J, Foster City, CA 94404. (415) 349-5700. NCP (July '89)

FONTastic Plus \$333% lets you customize and create bit-mapped tonts. Characters are easily added or modified. Version 2.01 edits larger fonts and supports NFNTs. Requires 512K, \$99.95. (Version 2.0.2 now available) Allsys Corp., 720 Avenue F, Suite 109, Plano, TX 75074. (214) 424-4888. NCP (May 89)

Fontographer 3.0 1111 is an upgrade of the top PostScript-iont editor/generator. New features include an integrated screen-lont editor, auto-tracing. and a pen tool. Screen-font editor automatically generates bitmapped fonts but is strictly bare bones. A professional tool that now also includes PostScript "hints" within your fonts. Can also be used for creating logos but needs better drawing tools for this purpose. Version 3.0. Requires Mac Plus, System 4.2, and inder 6.0. \$495. Altsys, 720 Avenue F, Suite 109, Plano, TX 75074. (Jan '90)

FontSizer tttt

creates high-quality screen fonts of any downloadable PostScript creates might quanty screen into that you will be a consistent by typeface in sizes up to 127 points. Excellent utility for producing large font sizes with true WYSIWYG Version 1.7. Requires 1 megabyte, PostScript printer, and fonts, \$99.95. (Version 2.0 now available with smaller screen font styles for \$129.95) Specialty Software Development, 110 Wild Basin Road, Suite 270, Austin, TX 78746. (512) 327-8608. NCP (Apr '89)

Hermes & Tribune Fonts \$\$\frac{1}{2}\frac{1}{2}\theta\$ are specially designed fonts that come in large sizes (up to 120 points). Optimized for the ImageWriter LQ, LaserWriter IISC, and lax modems. These fonts can replace Helvetica and Times and look better than Apple's fonts. \$59.95. Miles & Miles, 704 N. Water, #1, Ellensburg, WA 98926. (509) 925-5280. (Sept '89)

Adobe Illustrator 88 tttt/

is a professional-level graphics program from the people who defined the PostScript language. Uses templates for precise drawing and detailed artwork. Requires 1 megabyte. \$495. (Version 1.8.3 now available) Adobe Systems, 1585 Charleston

(Version 1.8.3 now available) Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900. (800) 447-3577, NCP (Oct 88) ★88 Eddy Image Studio t\$\$\$\$. puts a photo-retouching lab on the desktop. Editable brushes let you modify digitized images in 65 gray levels. Version 1.0. Requires 1 megabyte and two 800K disk drives. Mac II and MultiFinder friendly, \$495. (Version 1.5 now available) Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653. (201) 845-6100, NCP (June 88)

Images With Impact! ttttt

is superb, imaginative EPSF clip art. Images are pregrouped for easy editing. Business 1 (\$129,95) has 175 editable images in 14 categories, Graphics & Symbols 1 (\$99,95) is equally impressive. Requires 1 megabyte. 36 Graphics, 11410 N.E. 124th St., Suite 6155, Kirkland, WA 98034. (800) 456-0234. NCP (Aug '89)

Lasertalk tttt

is a PostScript programming tool that establishes interactive contact with laser printers. Preview window and on-line help make it a powerful tool. Requires 1 megabyte and a PostScript printer, \$249.95. Emerald City Software, P.O. Box 2103. Menlo Park, CA 94026. (415) 324-8080. CP until registered (May '88)

LetraStudio \$155
is a type-customization program for creating headlines, logos, signs, and other display type. Predefined envelopes let you create unique distortion effects. Works only with LetraFonts, which in turn are accessible only through the program. Version 1.0. Requires 1 megabyte and hard disk. \$495, plus \$75 per font. Fonts are copy-protected. Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653. (201) 845-6100. (May '89) * 88 Eddy

MacCalligraphy \$53% simulates brush painting. User-designed Seals and Touches enable you to design your own signature tool and the style of brush you use. Takes some getting used to. \$175. (Version 2.01 now available for \$149.95) Qualitas Trading, 6907 Norfolk Road, Berkeley, CA 94705. (415) 848-8080. NCP (Feb '88)

MacDraw II \$3\$% updates the venerable object-oriented draw program. Adds dithered and color patterns in its own documents but doesn't support color in the PICT II format. Version 1.0. Requires 1 megabyte and two 800K disk drives or hard disk. \$395. (Version 1.1v2 now available for \$399) Claris Corp., P.O. Box 58168, MS C-12, Santa Clara, CA 95052-8168. (408) 727-9054. NCP

MacGraphics \$\$\$ is an overwhelming collection of bif-mapped clip art — 13 thematic disks containing 10 megabytes of art. Unfortunately, most pictures are full-page, and reproduction quality suffers when they are reduced. Version 3.0, \$245. GoldMind Publishing, 12155 Magnolia Ave., Suite 3-B, Riverside, CA 92503. (714) 785-8685. NCP (Jan 89)

MacPaint ttt

hasn't lost its shine after all these years. Supports multiple windows, design templates, and a magic eraser for corrections. It lacks free rotation and distortion talents. Version 2.0, Requires 512K and second disk drive. \$125. Claris Corp., P.O. Box 58168, MS C-12, Santa Clara, CA 95052-8168. (408) 727-9054. NCP (July '88) *'85, '87 Eddy

MacroMind Director \$\$\$\$\$\$
is the best-equipped tool for creating color and black-and-white presentations. Object-oriented animation capabilities provide numerous editing leatures. Allows MIDI input. Version 1.0. Requires Mac Plus or later; 2 megabytes for color. \$895. MacroMind, 410 Townsend St., Suite 408, San Francisco, CA 94107. (415) 442-0200. NCP (Sept '89)

Mac3D \$\frac{\pmathbf{t}}{\pmathbf{t}}\text{\text{\$\gamma}} is a leature-laden 3-D program with a MacDraw-like interface. PostScript-resolution shading with six variable light sources. user-definable tools, and many more leatures. Clumsy interface to rotate objects and camera. Version 2.0. \$249. (Version 2.1 now available) Challenger Soltware, 18350 Kedzie Ave., Homewood, IL 60430. (312) 957-3475. NCP (Jan '87)

MapMaker tttt

is a digital cartograp for that charts demographic and marketing information on a geographic basis. Wide variety of maps available — some at an additional cost. Version 3.0. Requires 512K. S349. (Version 4.0 now available for \$395) Select Micro Systems, 322 Underhill Ave , York:own Heights, NY 10598. (914) 245-4670. NCP (Dec '88)

Metro ImageBase Electronic Art is a series of TIFF clip art from the grandfather of the clip-art industry. The traditional-looking images are huge, so have a large hard disk handy. Requires 512KE or later. \$145. Metro lmageBase, 18623 Vantura Blvd., Suite 210, Tarzana, CA 91356. (800) 525-1552. NCP (Aug '89)

MiniCad+ \$555 separates itself from its competition by incorporating a Pascal-like macro language, 3-D graphics, and a spreadsheet. Has a MacDraw-like feel, but added features compete with Claris CAD May have the best 3-D capabilities among low-cost CAD programs. Version 2.0, Requires Mac Plus or later, hard-disk drive, and System 6.0, 2 megabytes recommended. \$695. Graphsolt, 8370 Court Ave., Suite 202, Ellicott City, MD 21043.

Modern Artist 2.0 tt/

is still an interesting color paint program and has added a few new features, but there's not enough here to justify the substantial price increase. Requires Macintosh II, \$395. Computer Friends, 14250 N.W. Science Park Drive, Portland, OR 97229. (503) 626-2291, NCP (Feb '89)

Persuasion ttttt

is an outstanding presentation tool with an excellent drawing environment. Extensive AutoTemplates™and color schemes as well as multiple master slides make it easy to turn out presentations quickly. Version 1.0. Requires Apple System 4.1 or later, 1megabyte Mac Plus or later, and a hard disk. \$495. Aldus, 411 First Ave. S., Seattle, WA 98104-2871. (206) 628-2375. NCP (May '89) * 88 Eddy

Photon Paint ttt

is not the equal of Studio/8 or PixelPaint, but it does ofter a workable painting environment, multiwindow capability, some interesting special effects, and a lower price. Version 1.1. Requires Mac II with color card. \$299.95. (Version 2.0 now available for \$149.95) Microlllusions, 17408 Chatsworth St., Granada Hills, CA 91344. (800) 522-2041. NCP (May '89)

PictureBase tttt

is a powerful graphic librarian. You can store paint and PICT formatted items and attach keywords for later search and retrieval. \$69.95. (Version 1.2.3 now available for \$99) Symmetry, 225 E. First St., Suite 107B, Mesa, AZ 85203, (800) 624-2485, NCP (Sept '87) ★'86 Edcy

PixelPaint \$31% is a professional-grade 256-color painting program with a good interface, practical tools, and special effects. Works with many file formats. Four-color separation is built in. Includes PixelScan utility for Sharp and Howlek color scanners that has excellent 8-bit imaging. Version 2.0. Requires Mac II or SE/30 with 8-bit color board and 2 megabytes; hard-disk drive recommended \$595. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94403. (Oct '89)

PixelPaint Professional tttt

is the 32-bit descendant of the original PixelPaint. Interface sometimes hides the well-designed painting tools' capabilities. Supports four 256-color palettes per document, Includes several color-blending and -manipulating tools as well as anti-aliasing. Still has a few glitches but is a serious and necessary tool for electronic artists. Version 1,0. Requires Mac II series or SE/30; hard-disk drive; 2 megabytes for 8-bit color, 4 megabytes for true color, 8-, 16-, 24-, or 32-bil video card; color or gray-scale momitor; and System 6,03 or later, \$599. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086. (Dec '89)

PowerPoint tttt

is an easy-to-use desktop presentation tool. Good color schemes. Can send presentations to Genigraphics to produce color 35mm slides. Version 2.0. Requires System 4.1 or later, 1 megabyte, and two 800K drives or hard disk. \$395. Microsoft, 16011 N.E. 36th Way, P.O. Box 97017. Redmond, WA 98073-9717. (206) 454-2030. NCP (Aug '87)

ShowCase F/X ttt

is an animated-tilling package that provides several fextual effects, including Aegis' own Poly fonts, to use for making title sequences. Provides a good introduction to tweening and frame by-frame animation, Version 1.0. Requires color Mac II and 2 megabytes, \$395. Aegis Development, 2115 W. Pico Blvd., Santa Monica, CA 90405. (Dec '89)

Smart Art tttt

is a nitty PostScript utility disguised as a DA. It creates special effects with both text and graphics, and it lets you import EPSF files into any program. The initial release has 15 text effects: future releases will include customizable graphics effects. Version 1.0.1. Requires 1 megabyte and PostScript printer. \$149.95 Emerald City Software, 800 Menlo Ave., Suite 102, Menlo Park, CA 94025. (Oct '89)

Smart Art II and III tttt

are the second and third volumes of PostScript effects from Emerald City Software. Now packs an export facility and a much improved DA that includes direct printing, Volume II includes graphic elements; Volume III has text effects. Version 2.0. Requires Mac Plus and PostScript printer. \$149.95 per volume. Emerald City Software, 800 Menlo Ave.. Suite 102, Menlo Park. CA 94025. (Jan '90)

StandOut! tttt

is a presentation program built like a publishing program, with strong text and graphics support. Automatic text flow around graphic objects. Lacks good graphic examples. Version 1.0.

Requires I megabyte and two 800K drives or hard disk, \$295.

Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653. (800) 343-TYPE. NCP (Nov '88)

Streamline ttt

is Adobe's dedicated PostScript auto-trace package. Auto-tracing is all it does. Can quickly produce nearly print-ready traces with little tweaking. Retains original images' black-and-white values. Final touch-ups, however, must be completed in Illustrator 88 or asimilar program. Expensive for a single-function utility. Version 1.0 Requires Mac Plus or later and System 4.2 or later; 2 megabytes recommended. \$395. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900 (Nov '89)

Studio/1 \$55% is an excellent monochrome paint program that also has impressive flip-frame animation capabilities. You'll find an uncluttered animation surface, paint lools with 300-dpi capabilities, and a HyperCard playback utility (XCMD). Version 1.0 reviewed. Requires Mac Plus or later, \$149.95, Electronic Ats. (1820 Gateway Drive, San Mateo, CA 94404. (415) 572-2787. NCP (Sept 189)

Studio/8 \$\$\$\$\$
is a professional-level color paint application for the Mac II.

Superior tool set, elegant interface, excellent performance and speed. Version 1.0. Requires Mac II and hard disk; 2 megabytes of RAM recommended. \$495. (Version 1.1 now available) Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. (415) 572-2787. NCP (Jan '89) * 88 Eddy

Super 3D 11111 isahigh-power3-D modeling program with an excellent integrated interface. Powerful time-saver. Features include animation, import/export of 3-D worlds as text files. Excellent for art, design, or technical work. Version 1.0. Requires 1 megabyte. \$295. (Version 2.0 now available for \$495) Silicon Beach Software. 9580 Black Mountain Road, P.O. Box 261430, San Diego, CA 92126. (619) 695-6956. NCP (Jan '88)

SuperPaint 2.0 tttt

is the first upgrade of the original paint/draw program. Some of the new features are plug-in tools, auto-trace, Bezier curves, support for resolutions exceeding 300 dpi, and eight-color support. A good program but not particularly last. Version 2.0. Requires Mac Plus or later. \$199. Silicon Beach Software, P.O. Box 261430. San Diego. CA 92126. (619) 695-6956. NCP

Swivel 3D tttt

quickly forms shaded solids in full color. Casts true shadows onto other objects and can project color graphics onto solids. Objects can be linked as jointed and sliding mechanisms that can be operated without accidental dismantling. It can tween-animate objects or fly your view through a scene, saving frames for playback. Superb object-manipulation interface. Version 1.0. Requires 1 megabyte, Mac Plus, and two 800K floppy drives. \$395. (Version 1.1 now available for \$495) Paracomp, 123 Townsend St., Suite 310, San Francisco, CA 94107. (415) 543-3848. NCP (Mar '89)

TrueForm \$555% takes a scanned image of a paper form and turns it into an electronic equivalent, complete with fields for entering data. It can automatically sum numeric fields. Requires external 800K drive, \$495; run-time version, \$295. (Version 2.0 now available for \$395 for Set-Up & Fill-Out; \$295 for Fill-Out Program 4-Pack) Adobe Systems, 1585 Charleston Road, Mountain View, CA 94039-7900. (800) 447-3577. NCP (May '88)

VersaCAD 1311 is a powerful CAD program that doesn't show any of its MS-DOS roots, Excellent element manipulation, full plotter support. Library user interface is crude. Requires 1 megabyte. \$1,995. (Version 2.11 now available) Versacad, 2124 Main St., Huntington Beach, CA 92648. (714) 960-7720. NCP (July '88) ★ '88 Eddy

VideoWorks II \$\$\$\$\%\text{is an easy-to-use animation tool} — the best available on the Mac. Has an Overview mode that acts as a slide show carousel for presentations. Works in color on the Mac II. \$195. Requires 1 megabyte and an 800K drive. |Version 2 02 now available for \$295) MacroMind, 410 Townsend St., #408, San Francisco, CA (415) 442-0200. NCP (Mar '88) ★'85. '87 Eddy

VideoWorks II Accelerator tttt

compiles VideoWorks Il movies to make them run more smoothly Compensates for the QuickDraw screen display. Version 1.0. Requires 1 megabyte and VideoWorks II: hard-disk drive recommended \$195 MacroMind, 410 Townsend St., #408, San Francisco, CA 94107. (415) 442-0200. NCP (Dec. 88)

VideoWorks II Clip Animation tttt

is a group of three aids — Clip Charts, Black and White Movies, and Clip Sounds — that help you construct movies and business presentations. Requires VideoWorks II. \$49.95 to \$59.95. MacroMind, 410 Townsend St., #408, San Francisco, CA 94107: (415) 442-0200, NCP (Aug '88)

Visual Business No. 5 111% is a port of a DOS charting and presentations package. Excellent charting capabilities, including 3-D. More difficult to learn and use than Persuasion and PowerPoint. Can't store a whole presentation. Requires Output Manager (included) to print to a slidemaker. Includes only four LaserWriter tonts; set of additional LaserWriter Plus Ionls costs \$195. Not a good choice unless you specifically need one of its features. Version 1.02 Requires Mac If and System 6.0 or later, 2 megabytes required for Output Manager, \$395. Visual Business Systems, 700 Lake St., Suite H., Ramsey, NJ 07446. (Oct '89)

Vivid Impressions 11

is cardonish EPSF clip art, some of it in color, Special Events contains 130 images, many of them duplicates with minor alterations. Requires 1 megabyte, \$130, Casady & Greene, P.O. Box 223779, Carmel, CA 93922, (408) 624-8716, NCP (Aug '89)

WetPaint tttt

is a series of three-disk volumes of very-high-quality clip art. Also includes the Art Roundup DA, a good art browser/editor \$79.95 per volume. Dubl-Click Software, 9316 Deering Ave. Chatsworth. CA 91311. (818) 700-9525. NCP (Sept '87)

Works of Art Laser Art tttt is a nice collection of business-oriented EPSF clip art Requires 1 megabyte. Version 1.0. \$99.95. Springboard Sollware, 7808 Creekridge Circle, Minneapolis, MN 55435, (800) 445-4780, NCP (Aug '89)

World Class Laser Type tttt

is a six-volume collection of PostScript laser fonts that are an attractive alternative to the more expensive ones. Each volume comes on two 800K disks and includes screen fonts and PostScript-printer fonts. An excellent value, Requires PostScript printer, \$79.95 per volume, Dubl-Click Soltware, 9316 Deering Ave., Chatsworth, CA 91311, (Dec. 89)

HARDWARE & ACCESSORIES

A+ Mouse \$\$\$\$
uses infrared light reflected off a special pad to track mouse movement. No moving parts. Relative movement and clicking action feel similar to the standard Mac mouse, Non-ADB version, \$99.95, ADB version, \$129.95 MSC Technologies, 47505 Seabridge Drive, Fremont, CA 94538, (Oct 89)

AppleCD SC tttt

reads CD-ROM optical discs that contain up to 656 megabytes of data. Also plays audio compact discs. Reads High Sierra format, an industry standard for CD-ROM. Requires SCSI port. \$1,295. (Now available for \$1,199) Apple Computer, 20525 Mariani Ave., Cuperlino, CA 95014. (408) 996-1010. (Dec 88)

Apple Scanner \$55% not the state of the art but is adequate for scanner neophytes. The 4-bit (16 gray levels) scanner comes with AppleScan software and HyperScan, written by Bill Alkinson. Requires System 6.0. hard disk for full-page work, and SCSI connection cables, \$1,799, Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. NCP (Feb '89)

BitPad Plus ttt

offers basic drawing capabilities but no macro-making capability. Uses pens and pucks. Scaling of screen-to-pad ratio must be entered in pixels-to-inches. Must use MultiFinder to change settings while in an application, \$495, SummaGraphics, 60 Silvermine Road, Seymour, CT 06483, (Oct '89)

CalComp 2300A tttt

is a full-featured drawing tablet that lets you resize and reposition the drawing area. Three sizes, six different input devices (pens and pucks), and several software templates available. AE Template Manager lets you perform all the System and HyperCard menu functions on the lablet. \$595 to \$2,495. CalComp, 14555 N. 82nd St., Scottsdale, AZ 85260. (Oct '89)

Classic Professional Graphics Display

is a low-cost color monitor for the Mac II. Good value but has an IBM-look about it. Green tint is annoying. Requires Apple video card. \$549. (Single monitor now available for \$300) Classic Components, 1490 W. Artesia Blvd., Gardena, CA 90248. (213) 217-8020. (June '88)

DataPak tttt

a 45-megabyte removable Winchester hard disk. Great for backing up your main hard disk or transporting large amounts of data between office and home. Requires SCSI connector and System 4.1/5.5 or later. Drive, \$1,799.95; cartridges, \$149.95 each (now \$179.95 each) MASS Microsystems, 550 Del Rey Ave., Sunnyvale, CA 94086. (800) 552-7979. (Jan '89) Dest PC Scan 2000 tttt

is an 8-bit scanner that saves images in up to 256 levels of gray.
Can be configured for IBM PCs. Requires 1 megabyte. Scanner,
\$1,495; Publish Pac software, \$595; OCR text processor card,
\$995. (PC Scan 2000 now available for \$1,395) New Dest, 1015 East Brokaw Road, San Jose, CA 95131, (408) 436-2700, NCP

The Ergotron Workstation tttt

is the best, most versatile computer workstation around. This freestanding or walt-mountable heavy steel unit includes a high shelf for your Mac II and a movable, damped arm for your monitor. The unit comes in a variety of configurations. \$600 up. Ergotron, 3450 Yankee Drive, Suite 100, Eagan, MN 55121. (800) 888-8458. (Mar '89)

FAXstf ttt

is an early entrant in the lax modern race. Adequate, but slower than most fax machines, and using it as a normal modern requires changing plugs. Requires 1 megabyte of memory, and a hard disk is required. \$695. (Version 2.0 now available) STF Technologies, P.O. Box 247. Higginsville, MO 64037. (800) 935. 2009. https://doi.org/10.1001/ 876-0098. NCP (Feb '89)

Felix tttt

is a 5.75-inch-square optical-tracking mouse replacement. Space saver but awkward for lefties. Button on top of the pointer handle for mouse clicks. Drawing setting for absolute movement, \$169 ALTRA Technology, 1200 Skyline Drive, Laramie, WY 82070.

FreeWheel Pointer ttt

determines the user's head position by bouncing intrared light off a small, lightweight mirror on the user's forehead. Compact receiver unit and puff switch (can be mounted wherever convenient). Standard keyboard arrangement on-screen. Mac II and SE versions, \$1,095, ADB adapter, \$150. Pointer Systems, One Mill St., Burlington, VT 05401. (Oct '89)

Grappler LQ tttt

ooks Macs up to parallel laser and 24-pin letter-quality printers. A cable, driver software, and special fonts combine to make dozens of once-unfriendly printers now compatible with the Mac. Requires 1 megabyte and a parallel printer. \$149. Orange Micro, 1400 N. Lakeview Ave., Anaheim, CA 92807. (800) 223-8029 (Nov '88)

HeadMaster \$\$\$% is designed for users with little or no movement of their hands. It uses ultrasound signals emitted from a headset to determine the position of the user's head. Has a pull tube for the mouse button. On-screen keyboard appears as a couple of rows of characters. Very slow typing. Available for Mac 512K, Plus, SE, and Jl. S995. Prenike Romich Co., 1022 Heyl Road, Wooster, OH 44691. (Oct '89)

Hewlett-Packard ColorPro Plotter ttt is an eight-pen desktop plotter that requires third-party software to drive it. Fonts are limited to an optional Graphics Enhancement Cartridge that requires some BASIC programming \$1,295. Hewlett-Packard, 16399 W. Bernardo Drive, San Diego, CA 92127. (800) 654-5307. (Feb '88)

HyperDialer ttt

provides an interface between a phone and your Mac so you can dial a number using one of the Rolodex-type programs, like SideKick, Focal Point, or QuickDEX. Hooks up between the Mac's sound port and a telephone bandset. Requires 128K. MultiFinder friendly. \$39.95. DataDesk International, 7651 Haskell Ave., Van Nuys, CA 91406. (818) 780-1674. (Sept '88)

ImageMaker \$\$\$\$ shoots 35mm color slides directly from the Mac. Supports most present actions of twee Uses patterns to represent colors. Not fully compatible with the Mac II. Requires 512K, \$4,995. MacDriver software, \$149. (ImageMaker Plus now available for \$1,95. Font cartridge, \$195. One-year warranty, \$320) Presentation Technologies, 743 N. Pastoria Ave., Sunnyvale, CA 94086, (408) 749-1959. (Feb '88)

ImageWriter LQ tt%

outputs letter-quality text and graphics at 216 dpi. To do so, it reduces 72-dpi screen lonts to a third of their actual size. Takes a lot of memory. Printer Driver version 2.0. Requires 1 megabyte and large font sizes. \$1,400. Apple Computer, 20525 Mariani Ave., Cuperlino, CA 95014. (408) 996-1010. (Jan '89)

IS/ADB tttt

is a tablet that comes in three sizes with seven possible pointing devices, including multibutton pucks and multibutton styli. Operates in either absolute or relative modes; active area resizing on menu is handy for intensive drawing work. Twelve function keys, good for creating macros. \$495 to \$965. Kurta, 3007 East Chambers, Phoenix, AZ 85040, (602) 276-5533. (Oct '89)

IS/ONE Tablet 111%

with Penworks software lets you use a corded or cordless pen or mouse and a high-res tablet for precise graphics input. Minor bugs with some applications and DAs, Keystroke macros can be launched from the tablet. Minimal documentation. Requires 1 megabyte \$595 to \$1,145 Kurta 3007 E Chambers, Phoenix, AZ 85040. (602) 276-5533. (Jan '88)

LaserWriter IINT ttt

is Apple's mid-priced PostScript laser printer. It's faster than the LaserWriter Plus, with blacker blacks. Gray scale is less even than that of Plus. Requires 512K, \$4,599. (Now \$4,999) Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (May '88)

LaserWriter IINTX \$55% is Apple's top-of-the-line PostScript laser printer. 68020 chip makes it very speedy; expandable to 12 megabytes; SCSI hard



disk can be attached for fonts. Requires 512K. \$6,599. (Now \$6,999) Apple Computer, 20525 Marian, Ave., Cuperlino, CA 95014. (408) 996-1010. (May 88)

LaserWriter IISC \$\$\$

is Apple's low-end QuickDraw laser printer. Can be upgraded to: IINT or IINTX; reasonably fast. Requires 1 megabyte. \$2,799. Apple Computer, 20525 Mariani Ave., Cuperlino, CA 95014 (408) 996-1010. (May '88)

Mac Crate 60-Mb Hard Disk 1515
puts a Seagate drive in a platinum casing. At \$14 per megabyte
it's a good consumer value. Also comes in 20-, 40-, and 80megabyte models. Fequires SCSI port. \$839. Crate Technology,
6850 Vineland Ave., North Hollywood, CA 91605. (800) 5435808 national or (800) 323-9994 in CA. (Nov '88).

Mac-101 tttt

is a keyboard alternative that has a good leel to it. Has a keypad, 15 function keys, and more. The 101-Keys DA lets you define macros. Also comes in an ADB version for the SE and II. Requires 512K. \$169.95. (Three models available for \$194.95 each) DataDesk International, 7651 Haskell Ave., Van Nuys, CA 91406.

Mac 105 ADB Extended Keyboard ttt is a good alternative to Apple's Extended Keyboard, with a larger Return key, later and more sculpted key tops, and a lower overall weight. Requires Mac SE or Mac II. \$179, with Quickeys, \$199. (Now available for \$159; with Quickeys, \$189) Cutting Edge, P.O. Box 1259, Evanston, WY 82931–1259, (800) 443-5199.

MacAdios II \$\$\$\$ is a hardware and software interface for laboratory instruments Standard configuration samples up to 142 kilohertz. Documentation is sketchy, \$1,290 for Macintosh II-ready data-acquisition card (Now \$1,490); \$600 for MacADIOS II software interface. GW Instruments, 35 Medford St., Somerville, MA 02143. (617) 625-4096. (July '88)

MacBottom HD-70 Hard Disk tttt

is an excellent drive that comes with some very good software including HFS Backup, Requires SCSI port, \$1,995 (Now\$1695) 1,200-baud Hayes-compatible modem, \$200 extra. Personal Computer Peripherals Corp (PCPC), 4710 Eisenhower Blvd., Building A, Suite 4, Tampa, FL 33634, (800) 622-2888. NCP

MacDot-LQ 4%

is a 24-pin dot-matrix printer that emulates the ImageWriter LQ. It uses the LQ driver for compatibility, but it's not networkable and costs nearly \$200 more. Bug-ridden emulation often loses touch with your Mac. Requires ImageWriter II or LQ drivers' jumbo fonts for 216-dpi printing. \$1,590. (Now available for \$1,395. MacDot-PC available for \$1,555) Advanced Matrix Technology. 100 Rancho Road, Suite 27, Thousand Daks, CA 91361. (800) 637-7898 (Aug '89) Mach IV Plus 111%

has buttons on either side of the stick and one atop the joystick. Can be used as a mouse emulator. Comes in ADB and non-ADB models. Also available is a peripheral called Mirage that adapts earlier non-ADB CH joysticks for ADB use. Mach IV, \$89.95; Mirage, \$54.95. CH Products, 1225 Stone Drive, San Marcos, CA 92069. (Oct '89)

MacIntizer tttt

compares favorably with other tablets in terms of mouse emulation and drawing but lacks some software features. No built-in capability for using or creating overlay templates. Provides developer stacks for HyperTalk and Pascal. Active area resized through Control Panel. HyperCard-stack documentation. \$495. GTCO, 7125 Riverwood Drive, Columbia, MD 21046. (Oct '89)

Mac 'N Touch 1555 is a touch screen recommended for applications requiring a lot of pointing and clicking, works less well for programs such as graphics packages that require fine control. Available as an add-in screen for Mac SE and II models and as a snap-on screen for the SE only, Mac N Touch Add-In, \$745 (SE), \$895 (Mac II); Mac N Touch Snap-On, \$595 (SE only), MicroTouch Systems, Ten State St., Woburn, MA 01801. (Oct '89)

MacRecorder \$1150
is an audio digitizer for adding sounds to your Mac, animations, or HyperCard stacks. Supports an extensive array of audiomanipulation effects. HyperSound Toolkit makes adding sounds to HyperCard stacks easy. Version 2.0. Requires Mac Plus and 512K (1 megabyle highly recommended): HyperSound requires HyperCard version 1.2.1. \$249. Farallon Computing, 2201 Dwight Way, Berkeley, CA 94704. (Jan 90)

MacTable \$355% is an elegant Danish worktable that holds a Mac and printer with room to spare. The 30-inch deep by 60-inch wide table is made of particleboard and must be assembled. Cabinet is optional. Table, \$289; cabinet, \$139. ScanCo, P.D. Box 3217, Redmond, WA 98073-3217, (206) 481-5434. (Mar '88)

MacTRAC \$555/2
has Ihree buttons — a lock and two clicks — located above the trackball Equal ease of use for right- and left-handed people. Light signals that the lock button has been pushed. \$99. MicroSpeed, 44000 Old Warm Springs Blvd., Fremont, CA 94538. (Oct '89)

McIntyre \$15% is a joystick for people who can't use their hands. Can be mounted on a gooseneck stand. You manipulate the stick in your mouth to move the cursor while your to gue presses down on a button on top of the stick for clicking. An image of the keyboard appears on the bottom of the screen. Users can select letters and carry out most keyboard functions. Extremely sensitive, \$350. McIntyre Computer Systems, 22809 Shagbark, Birmingham, MI

Micro III-620 \$\$\$\$\footnote{3}\$ is a last 600-megabyte internal hard disk for the Mac II. The drive is a repackaged Impremis Wren V (Control Data). Average access ime is 16 milliseconds. Requires Mac II with low-profile SIMMs

time is 16 milliseconds. Requires Mac II with low-profile SIMMs. \$4,995. Microllet Technology, 20 Mason, Irvine, CA 92718. (714) 837-6033. (Aug '89)

**MouseStick \$\$3\$\frac{1}{2}\text{is useful where precise definition of movement is needed. The joystick has programmable settings; buttons can be programmed to carry out mouse-type functions or execute keyboard commands with single-, double-, or triple-clicking, \$129.95. Advanced Gravis Computer Technology, 1602 Carolina St., Suite #D-12, Bellingham, WA 98226. (Oct '89)

**Mouse Touch \$\$\$\$
is a fouch screen for selecting screens, pulling down menus, and entering numeric information via an on-screen keypad. Must be installed by the company. \$1,000 plus \$150 shipping if you

installed by the company. \$1,000 plus \$150 shipping if you already have a monitor, contact manufacturer for quotes on purchasing a monitor with Mouse Touch. Information Strategies. 888 S. Greenville Ave., Suite 121, Richardson, TX 75081. (Oct '89)

NetModem 1111 a 1.200-baud modem that can be accessed by all users on an AppleTalk network. The modem's display lights and the dial time are simulated on-screen. Requires 512K, \$599. Shiva 155 Second St., Cambridge, MA 02141. (617) 864-8100. (Feb '88)

Personal LaserPrinter 1513
is a non-PostScript laser printer at a great price. Clumsy workarounds required in some applications. Printing can be slow. Requires 1 megatyte. 51.999. (Now \$2.099) Fonts Plus. \$299. GCC Technologies, 580 Winter St., Waltham, MA 02154.

(617) 890-0880. (Apr. '88)

PhoneNET \$\frac{1}{2}\frac{ network and can be combined with AppleTalk on the same network. \$59.95 per node. Farallon Computing, 2201 Dwight Way, Berkeley, CA 94704. (415) 849-2331. (Dec. 86) *87 Eddy

ProPoint \$\$\$
has a click button and a small lock button on the lower left side of the trackball casing. Left-handed people may have to take their fingers off the ball to press the buttons. \$86. Abaton Technology, 48431 Milmont Drive, Fremont, CA 94538. (Oct '89)

PW10SL \$55% is a drawing tablet that offers friendly software setup and easy macro programming. Basic system menu commands, a mousing area, software controls, a macro pad, and a small keyboard drag along crieside. Click-and-drag scaling and moving of the drawing area. \$799. Personal Writer, 1900 Avenue of the Stars. Suite 2817, Los Angeles, CA 90067. (Oct. '89)

QMS Colorscript 100 tttt

is the first color PostScript printer that uses a four-color thermal wax transfer technology. Works on AppleTalk, Excellent typographic capability. Currently supports only a handful of applications. Requires 1 megabyte. \$21,995. (Model 30 now available for \$19,995) QMS, 1 Magnum Pass, Mobile, AL 36689. (205) 633-4500. (Oct '88)

QMS-PS810 \$11/2 is an eight-page-per-minute, 300-dpi PostScript laser printer that competes with the LaserWriter IINT. Two megabytes of RAM is standard; upgradable to 3 megabytes. Emulates HP LaserJet, 7475 (HPGL), and Diablo 630. \$5,495. (New price: Now \$4,995) Laser Connection, 7851 Schillinger Park W., Mobile, AL 36608.

Caser Connection, 7651 Schminger Park W., Modile, AL 30006. (800) 523-2696. (July '88)

quadLYNX \$\$\frac{1}{3} both ADB and non-ADB versions, \$99.95. Asher Engineering,

both ADB and hon-ADB versions, \$99.95. Asher Engineering, 15115 Ramona Blvd., Baldwin Park, CA 91706. (Oct '89)

Radius Accelerator 25 \$\frac{1}{2}\text{styt}\$
can make your Mac SE run 50 percent faster than a Mac II. The add-in accelerator card has a Motorola 68020 CPU that runs at 25 megahertz, and an optional 25-megahertz 68881 math coprocessor \$1,695; \$2,195 with optional 25-megahertz 68881 (Now\$1,395,\$1,895 with optional 25-megahertz 68882) Radius 1710 Fortune Drive, San Jose, CA 95131, (408) 434-1011

(Oct 188)

SpeedCard 11119:
is an accelerator board for the Macintosh SE that more than doubles the speed of most applications. The board uses the 68000 chip found in the SE and an optional floating-point 68881 chip for number crunching, Requires Macintosh SE, \$399; \$699 with coprocessor. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086, (408) 245-2202, (Nov 88)

StarTime/VideoShow tt

is an expensive hardware-software combination for creating and showing color presentations. Lets you create color presentations with an SE. Then using the VideoShow box and a monitor (including NTSC), you can play back your presentation without a Mac. Software is clunky and doesn't really take advantage of Mac graphics. Version 1.0. Requires Mac Plus or later, 20-megabyte hard-disk drive, VideoShow Model, color monitor, meganyte har ones over the medium of the med

Tektronix 4693D Color Printer \$155 is a 300-dp-bit-mapped color printer. Colors look smooth and rich. Uses bit-mapped screen fonts: most type has noticeable jaggies. Requires Mac II with color monitor. Recommended 8-Box 500, Beaverton, OR 97077. (800) 835-6100. (Oct 88)

Turbo Mouse ADB 11119

is a trackball that is a favorite mouse replacement. Mousing and locking functions can be reversed for left-handed people. Has a "chording" feature for a user-specified Command-key function. Space-efficient, \$169.95. Kensington Microware, Park Ave. S. New York NY 10011 (Oct '89)

V-series Smartmodem 9600 3111/2/2 is the fastest modem you can get for the Mac. To achieve high speeds, you'll need a special cable and software that supports the format. Requires 512KE, Mac-to-modem cable, and communications software. \$1,299. (V.42 and X.25 available) Hayes Microcomputer Products, P.O. Box 105203, Atlanta, GA 30348. (404) 441-1617. (Jan '89)

WriteMove \$35 is the smallest, lightest Mac printer around. It's an ink-jet unit that can produce resolutions of up to 192 dpi. It can run off rechargeable batteries or AC and weighs just 3 pounds. It comes with a good selection of Bitstream lonts. Printing quality varies widely depending on the paper and ink used. Printer Driver version 1.0. Requires 1 megabyte and hard disk. \$699. GCC Technologies. 580 Winter St., Waltham, MA 02154. (617) 890-0880. (Apr 89)

NUMBER CRUNCHING

Analog Connection Workbench tttt

is an icon-based application generator for general-purpose data acquisition, control, and analysis. Users create a flow diagram hat makes live color plots. Powerful and very easy to use. Version 3.0. Requires Mac SE or II. \$995. Strawberry Tree, 160 S. Wolfe Road, Sunnyvale, CA 94086. (408) 736-8800. NCP

Data Desk Professional tttt

lets you see statistics with more ease than any comparable Macintosh program. Plots variables so you can analyze data to see what patterns develop. Versicn 2.0. Requires 1 megabyte and two 800K disk drives or hard disk. \$495. Odesta, 4084 Commercial , Northbrook, IL 60062. (800) 323-5423. NCP (Nov '88)

Microsoft Excel tittt

version 2.2 is a major upgrade. Improvements include variable row heights, multiple lonts, improved macros, hot links to other Microsoft products, and an end to the 1-megabyte limit. Excel remains the standard. Version 2.2. Requires Mac Plus or later, System 6.0.2 or later, and two 800K drives; hard disk recommended. \$395. Microsoft, 16011 N.E. 36th Way. Box. 97017. Redmond, WA 98073-9717. (206) 454-2030. NCP

Exstatix \$555% is a powerful, Icil-leatured statistics program. Accepts userwritten plug-in modules. Very good graphing ability and excellent manual. Version 1.0.21. Requires Mac Plus or later, \$349. Select MicroSystems, 322 Underhill Ave., Yorktown Heights, NY 10598. (Nov '89)

Fastat \$1\$% is a subset of Systat. It also features a Mac interface and as a result is somewhat slow. Features included should be enough for all but the most demanding. Version 1.0. Requires 1 megabyte. \$195. Systat, 1800 Sherman Ave., Evanston, IL 60201 (Nov 89)

LabTech Notebook \$\$% is a general-purpose data-acquisition and -analysis package. This port from the DOS world has menus, but the interface is so poorly designed that you might as well be using a PC: This version deesn't even have a Print function. Version 1.0. Requires Mac II and System 5.0 or later. \$995. Laboratory Technologies Corp., 400 Research Drive, Wilmington, MA 01887. (508) 657-

LabVIEW 2 ttttt

is a graphical programming environment for creating applications for GPIB and other data-acquisition and -control operations. Data analysis includes complex math and signal processing Users can create on-screen control panels to emulate test instruments. The most complete such package on either PC or Mac. Requires 1 megabyte and hard disk. \$1,995. National Instruments, 12109 Technology Blvd., Austin, TX 78727-6204. (800) 531-4742. NCP (July '89)

(800) 531-4742, NCP (July 89)

MacInstruments \$\frac{1}{2}\frac{1}

MacLab tttt

turns your Mac into an oscilloscope with chart-recorder functions. This hardware/software package records 12 samples/hour to 80,000 sample/second. Nice interface and analysis features, such as slope of tangent and area under curve. Built-in amplifiers. Version 2.5. Requires 512K, \$2,925; optional differential amplifiers, \$1,125. World Precision Instruments, 375 Quinnipiac Ave., New Haven, CT 06513, (203) 469-8281, NCP (July '89)

MacPacq ttt

is a hardware/so tware oscilloscope and chart-recorder emulator that records 2 samples/hour to 10,000 samples/second. The portable hardware can be used remotely. Version 1.05e, Requires 512K.\$1,195, optional external amplifiers, \$295. BioPac Systems, 5960 Mandarin Drive, Suite D5, Goleta, CA 93117. (805) 967-6615. NCP (July '89)

Mathematica tttt

is a powerful tool for doing all kinds of math. Offers arbitraryprecision numeric calculations, symbolic computation, PostScript graphics, and programmability. Version 1.03. Requires 1 megabyte and a hard-disk drive. Requires 2 megabytes to run kernel. \$495; \$795 for the Mac II version. (Version 1.2 now available) Wolfram Research, P.O. Box 6059, Champaign, IL 61826. (800) 441-6284. NCP (Nov 88) * 88 Eddy

Math View Professional 1111 is an equation solver that combines 2-D and 3-D plotting with routines for matrices, differential equations and integrals, complex numbers, and the like. Interface leaves a lot to be desired. Version 1.0. Requires 512KE and two disk drives. Mac II and MultiFinder friendly. \$249.95. BrainPower, 30497 Canwood St., Suite 201, Agoura Hills, CA 91301. (818) 707-1712. NCP (Sept '88)

Microsoft Works \$155% has been the integrated program of choice for years, and version 2.0 shouldn't change that. Package includes word processing, spreadsheet, database, telecommunications, and object-oriented graphics. Supports color. Excellent value. May be all the software you'll ever need. Version 2.0. Requires Mac Plus or later and two 800K drives, \$295. Microsoft, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, (206) 454-2030, NCP (May '89)

101 Macros for Excel ttt

offers all the power of macros without having to learn how to write them. Some gems include a macro to transpose rows and columns, and a search-and-replace macro. Requires Excel. \$69.95. Individual Software 125 Shoreway Rd , Suite 3000, San Carlos, CA 94070. (800) 331-3313 or CA (415) 595-8855. NCP

Parameter Manager Plus tttt

analyzes data, using spreadsheetlike interface in real time. It can handle both hand-entered and imported data. Includes statistical quality control, equation fitting, predictive maintenance, histograms, drawing, and presentation. Version 3.0. Requires 1 megabyte. \$595; \$795 with communications module. GenRad, 510 Cottonwood, Milpitas, CA 95035. (408) 432-1000. NCP

Stat View II tttt

is a remarkably complete data-analysis package. Essential for any kind of descriptive, comparative, or multivariate statistics.
Works in color on the Mac II, Version 1.01, Requires Mac II or SE equipped with 68020 and 68881 math coprocessor and two 800K disk drives or hard disk. \$495, (Version 1.03 now available for Mac II, Mac SE/30) Abacus Concepts, 1984 Bonita Ava., Berkeley, CA 94704. (415) 540-1949. NCP (Oct '88)

WingZ \$\$\$\$\$
combines a powerful and roomy spreadsheet with an easy-touse scripting language for developing customized applications. Lacks a few standard spreadsheet niceties such as borders and plane splitting but makes up for it with glitzy graphics, including color and 3-D. Version 1.0. Requires 1 megabyte. \$399; University edition, \$89. Informix Software, 16011 College Blvd., Lenexa, KS 66219. (913) 599-7100. NCP (June '89)

PERSONAL FINANCE

MacInTax \$\$\$\$\$
is an excellent tool for preparing tax forms. Intuitive, easy-touse. Accepts data from leading personal-finance programs. Good built-in help. Liberal upgrade policy for current owners. California forms set also available, \$119 federal, \$65 California (Version 2.1 now available) SoftView, 4820 Adohr Lane, Suite F Camarillo, CA 93010 (805) 388-2626. NCP (Mar '87)

MacMoney \$555 is a financial manager that uses information gleaned from your checks and deposit slips. Produces a variety of reports and graphs. Version 3.01 reviewed. Requires 512KE and printer. \$119.95. (Version 3.5 now available) Survivor Software, 11222 La Cienega Blvd., Suite 450, Inglewood, CA 90304. (213) 338-0155. NCP (July '88) * '86 Eddy

Andrew Tobias' Managing Your Money

is a feature-laden personal-accounting system with added financial and time-management functions. Uses double-entry accounting. Too-cute documentation. Version 2.0, \$219.95.
Requires 1 megabyte, 128K or later ROMs. (Version 3.0 now available) MECA Ventures, 327 Riverside Ave., Westport, CT 06881, (203) 226-2024, NCP. (Apr '89)

Quicken 15155 is the best tool for home budgets, better cash-flow management and tax record keeping. Mimics your checkbook, so keeping track of your finances is easy and intuitive. Provides detailed reports supporting tax deductions and sources of income for schedules A, B, C, D, and E, Forms 1040 and 2106; and Canadian tax forms. Version 1.5. Requires Mac 512K, System 3.2, and Finder 5.3. \$59.95. Intuit, 540 University Ave., Suite 50, Palo Alto, CA 94301. (Dec '89) * 88 Eddy

Alto, CA 94301. (Dec '89) * 88 Eddy

Wall Street Investor \$\$\frac{4}{3}\frac{4}{3}\$

spots stock market trends. Downloads information from an electronic service. Good charting ability. Previously known as Market Pro. Version 3.0. Requires 1 megabyte, two 800K drives or hard disk, Hayes-compatible modem, and an LP. Sharp account. S695. Pro Plus Software, 2150 E. Brown Road, Mesa, AZ 85213. (602) 461-3296. NCP (Oct '88)

UTILITIES

Anti-Virus Kit \$55

is an antivirus utility that comes in three parts; an alert INIT, an application that installs a history file on any disk that records changes to that disk, and an application that helps identify the time an infection occurred. Doesn't include repair capabilities Version 1.0. Requires 512KE and System 4.1. \$79.95. 1stAic Software, 42 Radnor Road, Boston, MA 02135. (Oct '89)

AutoMac III \$\$\$% is similar to Tempo II and Apple's MacroMaker but is generally easier to use and comes with excellent documentation and a powerful Macro Editor, Version 2.0. Requires 512KE, \$79.95. Also distributed with Microsoft products (Word 3.02 and 4.0, File 2.0). Genesis Micro Software, P.O. Box 6236, Bellevue, WA 98008. (206) 747-8512. NCP (Feb '89)

98008. (206) 747-8512. NCP (Feb '89)

AutoSave DA \$\$\$
is insurance against system crashes. It saves your work automatically at intervals from 1 to 99 minutes. Compatible with many applications but not recommended for use with databases. \$49.95. (Update: AutoSave 2, Version 1.01 now available for \$49.95) Magic Software, 1602 Cascio Drive, Bellevue, NE 68005. (800) 342-6243. NCP (Jan '88)

BulkMailer+ \$\$\$\$
BulkMailer+ \$\$\$\$\$
is a basic mail manage with many powerful sorting features.

is a basic mail manager with many powerful sorting features.

Report setup can be a bit difficult but otherwise a line program. Can handle up to 9,600 names and addresses. Don't use with MultiFinder (in spite of what the manual says). Version 3,23. Requires 1 megabyte \$350. Satori Software, 2815 Second Ave. Suite 560, Seattle, WA 98121. (Oct '89)

CalendarMaker \$\$\frac{1}{2}\$\frac{1}{2}\$ is a utility that creates a variety of calendars. Many people use it to create personal calendars. Excellent printing routines. Version 3.0. Requires 512K or later and System 4.1 or later. \$49.95. CE Software, P.O. Box 65580, West Des Moines, IA 50265. (515) 224-1995. NCP (Sept '89)

Capture titts
is the most reliable screen-capture utility. Can capture full
screens or any area to either the Clipboard or a PICT file.
Supports 8- and 32-bit color. May have to be renamed to avoid INIT conflicts. Version 2.0. Requires System 5.0 or later. \$59.95 Mainstay, 5311B Derry Ave., Agoura Hills, CA 91301. (Jan '90)

ClickPaste \$15% puts the functionality of an ordered Scrapbook at the tip of your cursor. Most useful if you cut and paste to and from your Scrapbook. Version 1.0. Requires Mac Plus or later and System 6.0 or later. \$99.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301 (818) 991-6540. NCP (Sept. 89)

Complete Undelete ţţţţţ

is a superb file undeleter. Excellent interface, very fast, and capable of recovering even some partially overwritten files. It pays for itself very quickly. Get it. Version 1.0. Requires 512KE and System 5.0 or later. \$49.95. 1st Aid Software, 42 Radnor Road, Boston, MA 02135. (Jan '90)

Copy II Mac tttt

is a collection of powerful yet easy-to-use disk utilities. Disk copying and much more. Version 7.2. Requires 512K. \$39.95 Central Point Software, 15220 N.W. Greenbrier Parkway, #200, Beaverton, OR 97006. (503) 690-5162. NCP (Mar '89)

DiskExpress 1535 optimizes hard-drive performance by reorganizing fragmented files. Best of its kind, Version 1.5. Requires 512K, \$69.95. ALSoft, P.O. Box 927, Spring, TX 77383-0927, (713) 353-4090 NCP (Jan '89)

DiskFinder \$\$%

searches disks for files as well as cataloging disks. Requires 512KE, \$49.95. (Version 1.07 now available) Williams & Macias, South 3707 Godfrey Blvd., Spokane, WA 99204. (800) 752-4400. NCP (Feb '89)

DiskTools Plus \$t\$\$\$
is a set of eight useful DAs and applications. Earlier version was sold as Battery Pak. The DA Disk Tools II is a Finder replacement. Also included are an RPN calculator, Phone Pad, and Calendar Manager, Requires 512K, \$49.95, Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404, (415) 572-2787, NCP (Mar '88)

Eureka: The Solver 111

is a free-form numerical equation solver. Standard trigonometric and logarithmic functions are available, as is treatment of imaginary and complex numbers, \$195. Borland International, 1800 Green Hills Road, Scotts Valley, CA 95066. (408) 438-8400. NCP (Mar '88)

Fastback II tttt

is Fifth Generation's major upgrade of its backup program. Supports incremental and differential backups and your choice of compression levels. Backup configurations can be saved as oreference files. Macro language supports automated procedures. Nonstandard dialog boxes are occasionally unclear. Version 2.0. Requires. Mac. 512KE and. System. 4.2 or later. \$189. Fifth Generation Systems, 11200 Industriplex Blvd., Baton Rouge, LA 70809 (Oct '89)

Fast Formatter \$55% is the best, surest, most reliable bulk disk formatter available And the price is right. Works with any Mac. Version 3.0. Free Beyond, P.O. Box 31990, Tucson, AZ 85751, (Oct '89)

FEdit Plus \$555 is the file and disk editor for everyone, from newest Mac owner to oldest. It can do more for your disks and files than any other application. Can recover deleted MFS files. If you own a Mac, get it. HFS compatible, \$49.95. MacMaster Systems, 108 E. Fremont Ave., #37, Sunnyvale, CA 94087. NCP (Sept. '86) ★'86 Eddy

FileMagic t

is a file-management utility that tries to increase the power of the Standard File Dialog box. Your most frequently used files or folders install in a pop-out list for immediate access. Lets you copy or move folders. A good idea, but it's buggy. Version 1.0. \$99. Requires 512KE or later. Magnus Corp., 9025 61st Place West, Mukilten, WA 98275. (206) 828-1789. NCP (July '89)

Findswell 35353 is an indispensable utility that installs a new button in the Open dialog box of virtually every Macintosh application. Press the button, type a search string, click on Find, and Findswell searches for any files that match. Click Open or double-click to open the correct file. Requires 512K, \$49.95, (Version 2.0 now available for \$59.95) Working Software, P.O. Box 1844, Santa Cruz, CA 95061 (408) 423-5696, NCP (Nov '87) *87 Eddy

1stAid Kit 1st3% recovers lost or damaged files from floppy or hard disks. An excellent manual-turned-textbook actually teaches the Hierarchical File System. Requires 1 megabyte. Version 2.2. \$99.95 (Version 2.7 now available) 1stAid Software, 42 Radnor

Road, Boston, MA 02135. (617) 783-7118. NCP (June '88) Font/DA Juggler Plus 1111 gives you unlimited access to almost any number of fonts, desk accessories, and sounds. Uses hierarchical menus. \$59.95. (Version 1.14 now available) ALSoft, P.O. Box 927, Spring, TX 77383-0927, (713) 353-4090, NCP (May '88)

Forecaster 1111% lets you draw a curve on a chart. It then converts the curve to neatly rounded values for use in spreadsheets or elsewhere. Nearly foolproof and very useful for all who do budgets and other financial projections. Version 1.0. Requires 1 megabyte, \$69.95. Palo Alto Software, 260 Sheridan Ave., #219, Palo Alto, CA 94306. (Oct '89)

Ft. Knox tttt

offers a nice mix of security utilities. Two forms of encryption are supported, and files or volumes can be "sanitized" to U.S. national standards for top-secret materials. Version 1.04. Requires 512K. \$195. Transfinite Systems Co., P.O. Box N, MIT Branch Post Office, Cambridge, MA 02139-0903. (Nov '89)

Freedom of Press \$\frac{1}{2}\frac{1}{2}\frac{1}{2}\takes PostScript code generated by Mac programs and interprets it so that a wide range of non-PostScript printers can render the page correctly. In terms of Adobe fonts, you're restricted to the 35 fonts of the LaserWriter Plus. Creates PostScript copies of your documents that are always larger than the original. Version Requires Mac II, SE/30, or any Mac with math coprocessor, 1.5 megabytes; 800K drive; 2.5 megabytes of hard-disk space; and application that generates PostScript output. \$495. Custom Applications, Building 8, 900 Technology Park Drive, Billerica, MA 01821, (Jan '90)

HFS Backup tttt

is a top-class backup program with the widest set of features available. Ouick and very reliable. Version 3.0. \$99. Personal Computer Peripherals, 4710 Eisenhower Blvd., Building A4, Tampa, FL 33634. (Oct '89)

Hot Keys (MacWrite II version) ttt

is a set of MacroMaker macros for MacWrite II (versions for Works 2.0 and PageMaker 3.01 are also available). Includes utility macro software and a keyboard overlay. Works well and contains many useful macros (some for the Finder as well). Version 1.0. Requires System 6.0.2 or later, MacroMaker (included), extended keyboard. \$44.95 per version. K.I.S.S. (Keep It Simple Software), 324 Fuller, Suite C-3, Helena, MT 59601-9910. (Jan '90

Icon-It! tttt

lets you create icons to use as an afternative to menu commands. Use its 47 icon templates or create your own. Version 1.0. \$79.95. (Version 1.2 now available) Tactic Software, 13615 South Dixie, Miami, FL 33176. (305) 378-4110. NCP (Feb '88)

INIT cdev ttt is a no-frills freeware INIT manager that lets you turn INITs on or off simply by clicking on the names on a scrollable list. INIT cdev is accessible at startup, but it cannot make temporary changes. Version 1.0 reviewed. Requires 512K or later. Free, available on GEnie and CompuServe, John Rotenstein, P.O. Box 165, Double Bay, New South Wales 2028, Australia, NCP (Aug '89)

INITPicker \$555% offers a scrollable list of INITs in the System to let you determine their loading order. Holding down a predetermined keycombination at startup automatically shuts off all INITs and bypasses the INITPicker screen. Version 1.0 reviewed. Requires 1 megabyte, \$39.95. (Now \$49) Microseeds Publishing, 7030-B W. Hillsborough Ave., Tampa, FL 33634. (813) 882-8635. NCP (Aug '89)

Inix \$\$% is a combination INIT and DA that lets you choose separate startup sets. It does not let you decide to turn off a set temporarily (until the next startup), and it lacks the "run all" or "skip all" commands found in Aask and INITPicker. Version 1.1 reviewed.

Requires 512K or later. \$49.95. Natural Intelligence, 86 Richdale Ave., Cambridge, MA 02140. (617) 266-7858. NCP (Aug '89) JetLink Express \$13 is a printer driver that lets you print to HP non-PostScript printers. Provides a set of four special outline fonts that it automatically uses when you choose the standard Adobe fonts (additional fonts are available for \$198), includes cable. Terrible

MiniFinders

manual. Check application compatibility before buying. Version 1.0.1a. Requires Mac Plus; hard-disk drive; 512K printer memory (1 megabyte recommended), LaserJet IID, LaserJet III series, LaserJet Plus, DeskJet Plus, DeskJet, or HP-compatible printer; and System 6.0, \$149, GDT Softworks, 4664 Lougheed Highway, Suite 188, Burnaby, British Columbia V5C 6B7, Canada

LANDesign tttt

is versatile land-surveying software. It has a range of options that allow it to work the way surveyors worked before they had a Mac to help them. This is an intelligent program and thus easy to use Version 1.11. Requires 512KE or later and System 4.2 or later; hard disk recommended, \$595. Compuneering, 113 McCabe Crescent, Thornhill, Ontario L4J 2S6, Canada. (416) 738-4601.

MacBarCoda ttt/:
is a bar-code generator. Outputs as EPSF files. Easily the best program of its kind. Requires 1 megabyte and hard-disk drive. \$990. Computatabel, 18A Regent St., Narborough, Leicester LE9 5DJ, England, (Oct 28)
MacPrint tt/s
is a printer driver that lets you print to non-PostScript HewlettRestord and the Provider properties for the lets of the province of the lets.

Packard printers. Provides screen fonts for every imaginable HP tont cartridge and special Compugraphic screen tonts. Includes cable. Good manual. Check application compatibility before buying. Version 1.1. Requires Mac Plus; hard-disk drive; 512K buying, version 1.1 Requires what Plus, Nard-buss tilve, 512A printer memory (1 megabyle recommended), LaserJet IID, LaserJet II series, LaserJet Plus, DeskJet Plus, DeskJet, or HP-compatible printer, and System 6.0, \$149. Insight Development, 2200 Powell St., Suite 500, Emeryville, CA 94608. (Jan '90)

MacTREE 111

is an INIT that displays your Font menu, using the actual typelaces. Also adds Key Scroll, so you can navigate long Font menus by typing the first letter of font names. Version 2.02. Requires System 4.1 or later, \$49.95, Beyond, P.O. Box 31990, Tucson, AZ 85751. (Oct '89)

MockPackage + Utilities tttt

is a set of extremely powerful DAs. Includes a text editor, text rinter (supports LaserWriter), charter, terminal, and EZmenus HFS compatible, \$35. (Version 4.4 now available for \$49.95) CE Software, P.O. Box 65580. West Des Moines, IA 50265. (515) 224-1995. NCP (Mar '87)

Mug Shot \$155 is a simple program that looks inside your Mac and then tells you about it. In addition to the usual hardware data, Mug Shot lists all installed DAs, startup documents (INITs), cdevs, and RDEVs. This data can be vital if you run into conflicts or problems. Free. Mi Concepts, P.O. Box 8822, Kentwood, MI 49508. (Sept '89)

Multi Clip 1111

lets you create as many Clipboards as memory will allow. Can be used as a replacement for the Clipboard and Scrapbook. Has limited editing capabilities but lots of customizing possibilities. Version 1.0. Requires Mac Plus or later and System 6.0.2 or later. (Version 1.01 now available for \$99) Olduvai Software, 7520 Red Road, Suite A, South Miami, FL 33143 (800) 822-0772. NCP

MultiDisk \$\$\$\$ is an excellent software disk partitioner that allows partitions to be dynamically resizable, password-protected, and even encrypted. Version 1.0. Requires 512K or later. \$39.95. (Version 1.2 now available for \$69.95) ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927. (713) 353-4090. NCP (May '89)

NightWatch \$\$\$1% locks up your hard disk by using a floppy startup disk that acts as a key. Type in the correct password, and access to the hard disk is allowed. Version 1.02. Requires 512KE, a hard disk, and an 800K drive. Mac II and MultiFinder friendly, \$149,55. Kent Marsh Ltd., 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. (800) 325-3587. NCP (Sept '88)

On Cue \$555% lets you switch applications without returning to the Finder. Under MultiFinder, active applications are listed on a pop-up menu. Can also launch directly to a specific document, Version 1.0. Requires 512K. Mac II and MulhiFinder triendly, \$59.95. (Version 1.3 now available) ICOM Simulations, 648 S. Wheeling Road, Wheeling, IL 60090. (312) 520-4440. NCP (Sept '88)

OmniPage \$555 is a very good OCR program that can create editable text files cut of scanned images. It works only with certain scanners and requires a lot of memory, so be sure you can meet its requirements before you buy. Version 1.0. Requires 68020 and 4 megabytes. \$695. (Version 2.0 now available for \$795) Caere. 100 Cooper Court, Los Gatos, CA 95030. (800) 535-7226. NCP (Mar 89)

PC Tools Deluxe for the Macintosh ttt is a collection of seven applications, two DAs, and two INITs that perform various functions, from disk and file recovery to backup to disk optimization to encryption. Would be better if its elements

were better integrated. Doesn't have the smoothness Mac users expect. Requires 512KE or later and System 4.2 or later, \$79. (Version 1.1 now available) Central Point Software, 15220 N.W. Greenbrier Parkway, #200, Beaverton, OR 97006 (503) 690-8090, NCP (Aug '89)

PictureBook tttt

is a superb Scrapbook replacement. It catalogs your Scrapbook and lets you resize and/or crop anything that can be copied to the and lets you resize and/or crop anything that can be copied to the Clipboard. There's a lot of power here, and the interface is excellent. Version 3.1. Requires 512K or later; hard drive recommended, \$69.95. Loop Software, P.O. Box 1249, Menlo Park, CA 94026. (800) 288-7631, NCP (Sept 89)

POWERmenus \$1555 is two products in one. The first allows full access to menus from anywhere on the screen. The second, called Gadgets, includes a phone dialer, notepad; and useful application, DA, and Control Panel item launchers. Version 1.03, Requires System 5.0 or later \$79.95. Magic Software, 1602 Cascio Drive, Bellevue, NE 68005. (Jan '90)

PowerStation tttt

is an extremely easy-to-use, versatile, and powerful Finder substitute. Loaded with powerful features. Comes with Pyrol

substitute, Loaded with powerful features. Comes with Pyrol. \$59.95. (Version 2.5 now available) Fifth Generation, 1322 Bell Ave., Tustin, CA 92680. (800) 873-4384. NCP (Dec 87)

Pyrol. \$\$\frac{1}{2}\frac{1}{2}\text{is} is the premier Mac screen saver. All the required settings are found in the Control Panel. Pyrol darkens the screen and then shoots off tireworks, which can be mesmerizing. It can also display a clock. Version 3.3. Requires 512K or later and System. or later. \$24.95. Fifth Generation Systems, 1322 Bell Ave., Tustin, CA 92680. (800) 873-4384. NCP (Sept '89)

QuicKeys 3555 lets you make full use of your keyboard. Assign any command (menu choices, DAs, etc.) or series of text blocks and/or command to any key or key combination. Enormously powerful; necessary for Apple Extended Keyboard owners. Requires 512K, \$99.95. (Version 1.2 now available) CE Software, P.O. Box 65580, West Des Moines, IA 50265. (515) 224-1995. NCP (Jan '88) ★'87 Eddy

Read-It! \$\$\$\$\\^{2}\$ is an upgrade of Olduvai's OCR package. Still a good value and performer. Now includes printer drivers for most scanners, batch processing, background operation under MultiFinder, and 22 font tables. Recognizes multiple columns, italics, some foreign characters but not underlined text. Version 2.0. Requires 1 megabyte, S495. (Version 2.1 now available) OLDUVAI, 7520 Red Road, Suite A, South Miami, FL 33143. (800) 822-0772. NCP (June '89)

Redux tttt

is an excellent incremental-backup program. Lets you back up files, folders, or entire volumes. F control, you can write your own "scripts," using the Redux control language, BackTalk. Comes with Redux Restore, a restore utility that can be distributed freely. Version 1.5. Requires 1 megabyte, \$99. Microseeds Publishing, 7030-B W. Hillsborough Ave., Tampa, FL 33634. (813) 882-8635. NCP (July '89)

RésumExpert 1111 is a set of résumé templates with a superb manual. If you need a good résumé, this is the way to go about it. Versions for Word 1.05 (shuder) and Works are also available at the same price. Requires 512KE and Word 3.0 or later. \$49. A Lasting Impression. 49 Thornberry Road, Winchester, MA 01890. (Oct '89) SAM (Symantec AntiVirus

Macintosh) \$5555 is the best commercial antivirus utility available. Includes an alert INIT, repair capabilities, and customizable alert options and has a useful Report feature. Version 1.0. Requires Mac 512KE and System 4.2/Finder 6.0 or later. \$99.95; annual-upgrade subscriptions, \$60; one-sho; upgrades, \$15. Symantec, 10201 Torre Ave., Cupertino, CA 95014. (Oct 89)

Screen Gems \$155 is a package of five color utilities for Mac II owners. Color Desk puls art behind your desktop. Dimmer dims the screen when the Mac is inactive, and Switch-a-Roo lets users switch between any wac is inactive, and switch-a-root less users switch between any two color modes instantly. Globe is a neat demo, and TN-3 lets you customize the Finder's Color menu. Version 1.0. Requires Mac II with 2 megabytes, color monitor, and System 4.2 or later. \$79. Microseeds, 7030-B W. Hillsborough Ave., Tampa, FL 33634 (813) 882-8635, NC* (Sept '89)

ScreenRecorder 111/21% is a utility for recording your on-screen Mac activities. Ideal for presentations and training. Uses a tape-recorder model, "Tapes" can include sounds recorded with applications such as

can include sounds recorded with applications such as MacRecorder and can be a fixed length or loop. Recordings can also be installed into HyperCard stacks for easier distribution. Version 1.0. Requires 1 megabyte, \$195. Farallon Computing, 2201 Dwight Way, Berkeley, CA 94704. (415) 849-2331. NCP (June '89)

Sentinel tttt

encrypts data files (or sets of files) using a super-secure DES or a super-fast SuperCrypt algorithm. Provides high-level security if you can keep your passwords secret. Requires 512KE. \$295 (Version 2.0 now available for \$149) SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086. (408) 245-2202, NCP

Set Clock tttt

makes a ten-second phone call to Leilch Video's master clock driver (near the East Coast) and then sets your Mac's time within one-second accuracy. Version 1.8.1. Requires 300-bps or faster modem. Free. Leitch Video International, 10 Dyas Road, Don Mills, Ontario M3B 1V5, Canada. (Nov '89)

Silverlining \$155% is an advanced hard-disk-utility set. It has the best diskpartitioning software available and can format most hard disks. It also has powerful and safe optimizing and testing features. Excellent performance. Also includes DS Backup, OK backup software, and a nice disk duplicator. Version 5.16. Requires Mac Plus and SCSI device. \$69.95. La Cie, 16285 S.W. 85th, Suite

306. Tigard, OR 97224. (Jan '90)

SmartScrap and The Clipper 1111/2 are two useful DA utilities for graphics work. SmartScrap is a major enhancement to the standard Scrapbook DA. The Clipper provides you with a transparent Clipboard window, allowing you to resize or crop a graphic to the area that it will be pasted to. \$59.95. (Version 2.01 now available for \$89.95) Solutions International, 30 Commerce St., Williston, VT 05495. (802) 658-

5506. NCP (July '87) * 87 Eddy
SnapJot tttt
is autility that lets you capture screens or parts of screens. Differs
from similar products in that the captured window remains onscreen in a real window and so can be used as you work. Version 2.0. Requires System 4.1 or later. \$36. Trillium Software, 21W171 Coronet Road, Lombard, JL 60148, (Oct '89)

Sonar Professional

sonar Professional % an overpriced text searcher that still requires too much ongoing effort for the results it is capable of. If the setup requirements were eliminated, the search abilities and speed would be without peer. Version 3.1. Requires Mac Plus. \$795. Virginia Systems Software Services, 5509 W, Bay Court, Midlothian, VA 23112. (Jan '90)

Sound Manager Package \$555% is a group of well-implemented sound-file manipulators and players. The best and most versatile utility set available for sound (as opposed to music) aficionados. As a bonus, many useful and amusing sounds are included on-disk. Version 1.40. Requires 512K and System 4.1 or later. \$20 shareware fee. Ettore Software, 67 Rue de la Limite, 1970 W-Oppem, Belgium Include International Reply Coupon with all information requests.

SoundMaster tttt% is an elegant cdev that lets you assign sounds to a wide range of actions, including startup, shut down, diskinsertion, and assorted key presses. Version 1.2. Requires System 4.1 or later. \$10 shareware lae, Bruce Tomlin, 15801 Chase Hill Blvd., #109, San Astroic N. 278056. Manual Chase Hill Blvd., #109, San Astroic N. 278056. Antonio TX 78256. (Nov '89)

Stepping Out II tttt

is a software alternative to a large-screen monitor. Lets you create a virtual screen (as large as memory allows) inside the Mac's 9-inch screen. Automatically scrolls to new document position as you type or draw. Version 2.0. Requires 1 megabyle, \$95. Berkeley System Design, 1700 Shattuck Ave., Berkeley, CA 94709. (415) 540-5535. NCP (Oct '88)

Stufflt ttttt

compresses files to reduce the amount of space they take up ondisk. Great for transferring documents via modern. Also joins and encrypts files. Version 1.5. Requires 512KE. Shareware fee, S25. Aladdin Systems, 217E. 86th St., Suite 153, New York, New York 10028. (212) 410-3080; also available on most electronic services. NCP (Dec '88)

Suitcase II \$\$\$\$\$\$

is even better than its predecessor. Increased file-management capabilities enable you to open 99 font, DA, sound, or FKey files capacinttes enable you to open 99 font, OA, Sound, OT Key Nies, at a time. Can display any installed font in any style. Fonts can also appear in their proper typefaces on their font menus. Includes Font Harmony for resolving font number conflicts, and Font & Sound Valet for font and sound compression. Version 1.2.2. Requires 512KE or later. S79. Fifth Generation Systems, 1322 Bell Ave., Tustin, CA 92680. (800) 873-4384. NCP (June 190) 4-193. Fields.

SUM II tttt

is an upgraded and expanded version of the essential SUM data-recovery utility. Now includes utilities for partitioning, encrypting. backing up (based on Redux), and optimizing. None of these modules is preferable to the dedicated packages available, but They all work. The recovery module is still the best and now has a much improved interface. It's the reason to buy SUM II. Version 2.0. Requires Mac Plus or later, System 4.2, and Finder 6.0. \$149.95. Symantec, 10201 Torre Ave., Cupertino, CA 95014.

SuperClock! titit is simply the best on-screen time indicator or clock. Can work properly in every environment and also has excellent timer and alarm functions. Version 3.5. Requires System 4.1 or later. Free. Steve Christensen, CompuServe 76174,1712: AppleLink Christense1. (Nov '89)

SuperGlue II \$5555 is the newest and best print-to-disk program. Offers superior operation along with many nice added touches, such as Glue operation along with many nice added touches, such as Glue
Notes (Post-il-like notes) and One-Timer, an Fkey that makes
operation immensely easier. Version 1.0. Requires System 6.0
or later. \$119.95. Solutions International, 30 Commerce St.,
Williston, VT 05495, (Nov 89)

Tablecloth

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and far more pleasant. Hides all but the active window when you triple-click in the window. Version 1.0. Requires System 6.0.1 or later and MultiFinder 6.0.1. Introductory price, \$29.95; regular price, \$49.95. User-Tek. 4444 E. 66th St., Suite C, Tulsa, OK 74136, (Oct '89)

Tempo II tttt

is a powerful keyboard macro program that gives owners of extended keyboards their money's worth. Especially good for building sequential macros. Features include conditional branching and the ability to remember menu selections by name. Version 1.0. \$149.95. (Version 1.02 now available) Affinity Microsystems, Ltd., 1050 Walnut St., Suite 425, Boulder, CO 80302. (303) 442-4840. NCP (Dec '88)

TextPert tts//
is a trainable OCR package. Requires less hardware than
OmniPage does but is slower. Acceptable accuracy requires
teaching. Supports more than 30 languages in Roman fonts only and popular scanners directly. Version 3.0, Requires Mac Plus and high-resplution (at least 200-dpi) scanner. \$995. CTA, 747 Third Ave., Third Floor, New York, NY 10017. (Oct '89)

Vantage 1111 is a text-editor DA and the commercial version of McSink. It can change case; count the number of lines, words, sentences, or paragraphs in a selection; and search and replace on character strings (including invisibles). Supports macros and external commands written in Pascal. Includes a spelling checker. Version 1.0 Requires 512KE or later, \$99.95. Preterred Publishers, 5100 Poplar Ave., Suite 617, Memphis, TN 38137. (901) 683-3383. (July '89)

Virex tttt

is an excellent virus preventer, detector, and eradicator. Works against known viruses and has an excellent support and update history, Version 2.1. Requires Mac Plus and System 5.0 or later. \$99.95: annual update service, \$75. HJC Software, P.O. Box 51816, Durham, NC 27717. (Jan '90)

Virtual tttt

provides virtual-memory capability for any Mac equipped with a 68030 or 68020 with PMMU. Works smoothly and comes in versions with a PMMU for those with 68020-based Mac IIs. Version 1.05. Requires 2 megabytes (highly recommended) and 8 megabytes of contiguous hard-disk space; System 6.0.2 recommended. Without PMMU, \$199; with PMMU, \$275. Connectiv Gorp., 125 Constitution Drive, Mento Park, CA 94025.

Word Wrapper \$\$\$% is the sort of simple utility you find useful several times a day (if you felecommunicate much). Wraps or breaks Mac-created text files to a user-specified length and also adds line breaks (using some intelligence) to received text files that need them. Requires 512K. \$29.95. International Technology Development Corp... 1990 Lombard St., #250, San Francisco, CA 94123-2807.

WorksPlus Command \$155 lets you build and deline macros for all Works modules. Predefined macros provide for an even tighter integration of the program's word-processing, spreadsheet, and database modules. Re 1 megabyte, \$99.95. (Version 2.0 new available for \$149.95) Lundeen & Associates, P.O. Box 30038, Oakland, CA 94604. (800) 233-6851, NCP (May '88)

XTreeMac \$\$ is a file-management utility that uses a file-card metaphor. Can recover deleted files, and supports litters for grouping specified treever deteled lies, and supports littlers for grouping specified types of flies. Not for network use. Buggy. Version 2.0. Requires Mac 512KE or later, System 4.2, and Finder 5.3 or later, Sys. XTree Company, 4330 Santa Fe Road, San Luis Obispo, CA 93401. (805) 541-0604. NCP (Sept '89).

WORD PROCESSORS

ArchiText 1111

is a text processor with many hypertext capabilities as well as the ability to include graphics. "Nodes" of fext are accessed by means of different "maps." Very powerful. Version 1.0. Requires 1 megabyte. \$349.95. (Version 2.04 now available for \$395) BrainPower, 30497 Canwood St., Suite 201, Agoura Hills, CA 33201, 433.372, 123.4. ACP. (Eds.) 240. 91301. (818) 707-1712. NCP (Feb '89)

DocuComp 111 lets you compare two versions of a word-processing document Displays inserted text in the newer document with underlining and moved text in boldface. Older document shows deleted and moved text with strikeout characters. Excellent reporting feature details all the revisions made to a document. Supports plain-text. WordPerfect, WriteNow, and Word formats, Version 1.11. Requires Mac 512KE or later, System 4.1; Finder 5.5; and WordPerfect, WriteNow, or Word; hard-disk drive recommended. \$159.95. Advanced Software, 1095 E. Duane Ave., Suite 212, Sunnyvale, CA 94086. (Dec '89)

Expressionist 3333 is a powerful DA that allows you to create complex mathematical equations from within an application. Equation manipulation has never been easier. (Version 2.0 now available for \$129.95) Prescience, 814 Castro St., San Francisco, CA 94114. (415) 282-5864. NCP (July '87)

ExpressWrite \$155% is a letter-writing DA. Has excellent mail-merge capability and merges envelopes as well as letters. Good formatting ability. Restricted only by inability to use graphics. Version 1.01.
Requires 512KE or later and System 4.1 or later. \$99.95 Exodus
Software, 8520 Winton Road, Soule 304, Cincinnati, OH 45231.
(513) 522-0011 NCP (Sept '89)
FeiMa-P 111

allows users to create their own Chinese characters. This Chinese

word processor follows the Mac interface more closely than Kaihin Brushwriter, Lets you create your own characters for those that aren't included in the dictionary. Version Previewed. Requires 512K or later. \$585. (Version 4.1 now available for \$595) Wu P.O. Box 699, Avon. CT 06001. (203) 677-1528. CP (May 89)

(May 89)

Formulator \$\$\$\$%:
is a powerful and easy-to-use formula-setting application. Can output in TeX as well as "regular" format. Version 1.1. Requires 512K and runs only with U.S. System software. \$149.95. ICOM Simulations, 648 S. Wheeling Road, Wheeling, IL 60090.

FullWrite Professional tttt

combines outlining and word processing with page layout and drawing, its many features translate into sluggish performance unless you have a lot of extra RAM. Impressive, Version 1.0. Requires 1 megabyte. Mac II and MultiFinder friendly. \$395 Ashton-Tate, 6411 Guadalupe Mines Road, South San Jose, CA 95120. (213) 327-1111. NCP (Sept '88)

Graham Speller ttt

Graham Speller 333 is a DA-based spelling checker. Includes macro feature. Good guesser in Interactive mode. Clumsy Interface, Version 1.1, \$44.95. Graham Soltware, 8609 Ingalls Circle, Arvada, CO 80003. (303) 422-0757. NCP (Sept '88)

Kadmos Greek Font \$15% is a full character set of ancient Greek that prints on any PostScript printer. Requires learning new typing skills, but excellent quality makes it worth the effort. \$85. (Version 2.0 now available.) Allofype Typographics, 1600 Packard Road, Suite 5 Ann Arbor, MI 48104. (313) 663-1989. NCP (Oct "87)

Kaihin Brushwriter 11 is a Chinese word processor that fails to support the Mac interface. It has 8,000 characters. You must speak Chinese to use this program. Won't work with System 6.0. Version 2.0. Requires 1-megabyte SE and adapter (included) to save and print files. \$599 for professional package (reviewed). Pacific Rim Connections, 3030 Alwater Drive, Burlingame, CA 94010. (415) 697-0911 NCP (May '89)

Language Master ttt

is an electronic dictionary and thesaurus in a DA. The dictionary contains definitions, hyphenalion points, and part-of-speech information for more linan 83,000 entries. The thesaurus has 40,000 unique entry points with synonym information for different parts of speech. Version 1.0. Requires Mac Plus. System 4.2, and Finder 4.0. \$99. Franklin Sollware, 3511 N.E. 22nd Ave., Fort Lauderdale, FL 33308. (Jan '90)

Lookup ttttt

is an on-call, quick, single-word spelling checker, Designed for the way writers really work, Uses the 93,000-word Spellswell dictionary, \$49.95. (Version 2.0 now available for \$59.95.) Working Software, P.O. Box 1844, Santa Cruz, CA 95061-1844. (408) 423-5696. NCP (Dec '87)

MacEnvelope tttt

is the best envelope printer currently on the market. Can handle color, graphics in the return-address fields, messages, and labels. Data can be imported. Sorts on name or zip code. Version 4.1. Requires 512KE, \$89.95. Synex, 692 Tenth St., Brooklyn, NY 11215. (Oct '89)

MacPhonebook \$5\$% handles name-and-address lists (up to 1,600 entries). Its forte is printing out the lists in large, medium, and small (Little Black Book) formals. Version 1.0. Requires 512K. \$39.95. Synex, 692 Tenth St., Brooklyn, NY 11215. (Oct '89)

MacWrite II tttt

is MacWrite's lirst major upgrade and a big increase in power. Excellent interface. Powerful Search/Replace function. Elegant multiple-column and mail-merge features. Terrible performance on 68000 machines. Version 1.0. Requires Mac Plus or later and two 800K drives or hard disk. \$249. Claris Corp., 5201 Patrick Henry Drive, P.O. Box 58168, MS C-12, Santa Clara, CA 95052-8168. (408) 727-9054, NCP (Aug '89)

MergeWrite ttt

is a mail-merge program for MacWrite (also works with ASCII files). Program combines names and addresses from a data file into predefined fields in a form fetter. Also allows simple conditional IF/THEN/ELSE equations. \$49.95. Software Discoveries, 137 Kranski Drive, South Windsor, CT 06074, (203)872-1024. MCP (Dec '87)

MindWrite tttt

integrates outlining and word processing better than any other program. Fixes many problems of the earlier version, Sophisticated search and select options. Unimpressive speed Version 1.1. \$195. (Version 2.1 now available) DeltaPoint. 200 Heritage Harbot, Suite G, Monterey, CA 93940. (408) 375-4700. NCP (Feb '88)

Mishu \$555% is a DA that turns MacWrite and Microsoft Word into a Chinese word processor. It will also work with Cricket Draw, HyperCard, or any program that reads PICT files. You must use MacWrite 3.5 or later and Word 3.0 or later. Version 2.1. Requires 512K or later \$89. Xanatech, 20 Fresh Pond Place, Cambridge, MA 02138 (617) 492-7463, NCP (May '89)

Nisus \$333 is powerful but not perfect. This direct descendent of the OUED/ M text editor has an Easy-GREP function, a built-in MacDraw-like graphics environment, and indexing capabilities. Lacks heyplenation, kerning, footnotes, and cross-reference-marking functions. Version 1.0. Requires Mac Plus, two 800K drives or hard-disk drive, and System 4.2. \$395. Paragon Concepts, 990 Highland Drive, Suite 312, Solana Beach, CA 92075, (July '89)

QUED/M tttt

is an excellent 13137.

is an excellent text editor that saves documents in a form readable by most computers and printers. Doesn't support graphics or multiple fonts. Programming language allows creation of database. Version 2.01. \$129. (Version 2.07 now available for \$119) Paragon Concepts, 990 Highband Drive, Suite 312, Solano Beach, CA 92075. (619) 481-1477. NCP (Mar '88)

QuickLetter tttt

is a well-designed and thoughtfully implemented DA for the creation of letters and envelopes. You can create stationery, complete with graphics, and maintain an address book including salutations. It's the best envelope creator/printer in any word processor. Version 1.0. Requires 512K. \$124.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061-1844. (408) 423-5696. NCP (Apr '89)

Sensible Grammar ttt

corrects some of the more glaring errors that writers make. Also analyzes the word court and structure of sentences to come up with a readability rating. Slow. Version 1.1d. Requires 512K. \$99.95. (Version 1.5.2 now available) Sensible Software, 335 E. Big Beaver, Suite 207, Troy, MI 48083. (313) 528-1950. NCP

Spelling Coach Professional tttt

is a DA and stand-atone spelling checker as well as a thesaurus. Includes dictionary definitions. Off-the-wall phonetic guesses. Version 3.0, \$195. Denba Software, 3305 N,W. 74th Ave., Miami, FL 33122 (305) 594-6965, NCP (Sept '88)

Spellswell tttt

is a stand-atone batch spelling checker. Also checks for punctuation and other errors. Good dictionary, thorough checking, simple interface but weak guessing. Version 2.0. \$74.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061-1844, (408) 423-5696. NCP (Sept '88) ★'86 Eddy

Thunder II \$55\\\
\$5 a major upgrade of Thunder!, the popular spelling checker.
Now a cdev/INIT, Thunder II launches at startup. Users select the dictionaries and applications with which it should run. Checks for spelling, punctuation, capitalization, and double-word errors. Includes application-specific "compatibility modules" to retain character formatting. Editable glossary. Version 1.0. Requires Mac Plus and System 5.0 or later. \$79.95. Electronic Arts, 1820 Gateway Drive, San Maleo, CA 94404. (Oct '89)

Microsoft Word 4.0 \$\frac{3}{2}\frac{3}{2}\frac{3}{2}\frac{3}{2}\frac{1}{2}\frac{3}{2}\frac{1}{2}\f links to Excel and Microsoft Mail. Has enough DTP capabilities to format almost any document, without compromising its beforming any doubleffit, Minor Configurations of the performance as a dedicated word processor. Requires 512KE or later, two 800K floppy drives or hard disk. System 3.2, and Finder 5.3 or later. \$395. Microsoft, 16011 N.E. 36th Way. Box 97017, Redmond, WA 98073-9717, (206) 454-2030. NCP (July '89)

Word Finder ttt is an electronic thesaurus that won't replace your trusty Roget's but is still useful for checking synonyms on the fly. Large, respectively. Version 2.0. Requires 512K. Mac II and MultiFinder friendly. S59.95. Microlytics. Two Tobey Village Office Park, Pittsford, NY 14534. (716) 248-9620. NCP (Sept '88)

WordMaker 111 // lirst appeared as an Amiga word processor, ProWrite. Low- to midlevel program with an interface similar to that of the original MacWrite. Supports up to eight open documents, imported color graphics, and mail-merge. Slow performance on 68000-based machines. Not a good choice compared with MacWrite II or WriteNow. Version 1.0. Requires Mac 512KE or later and System 4.1 or later; two 800K drives or hard-disk drive recommended. \$124.95. New Horizons Software, P.O. Box 43167, Austin, TX 78745. (Nov '89)

WordPerfect \$55% is a good choice for offices needing compatibility but not so hot otherwise. Good internal lile-management system and macroonerwise Good meteral ine-management system and malor-maker. Uses hiddenformalting codes, hierarchical menu system. Requires Mac 512KE and System 4.1 or later. Two 800K disk drives or a hard disk recommended. Not fully compatible with System 6.0, \$395. WordPetrect, 1555 N. Technology Way, Orem, UT 84057, (801) 225-5000. NCP (Feb '89)

WorksPlus Spell \$15,9 is a speedy spelling and hypenation checker for Microsoft Works, It includes a glossary for abbreviations and time/date stamping. The biggest drawback is its limitation to one program. \$99.95. (Version 2.0 now available.) Lundeen & Associates, P.O. Box 30038, Oakland, CA 94604. (800) 233-6851. NCP (Oct. 2009) 233-6851. NCP (Oct. 200 '87) H'87 Eddy

Microsoft Write \$35 is a "beginner's" version of Word 3.0. More features than some word processors in its class, but not all of the features work well. Poor value and an expensive upgrade path to Word. \$175. Requires 512K. (Version 1.0 now available for \$125) Microsoft. 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717. (206) 454-2030. NCP (May '88)

WriteNow 2.0 tttt

is the fastest, best pure-writing program available. Excellent is the lastest, dest prote-wing program available. Excelling spelling checker, mail-marge, graphics inclusion, footnotes, and header/footer control. Still runs on any Mac. Wonderful interface, as intuitive as the original MacWrite interface. Supports RFF. Version 2.0. Requires 128K or later. \$195. T/Maker. Company, 1390 Villa St., Mountain View, CA 94041. (415) 962-0195. NCP (May '89)

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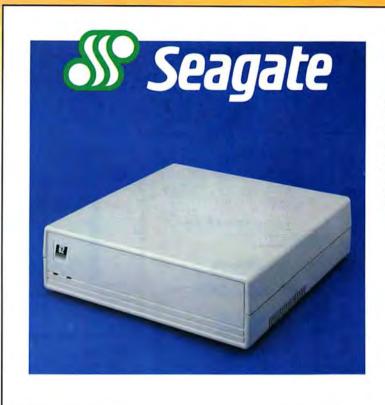


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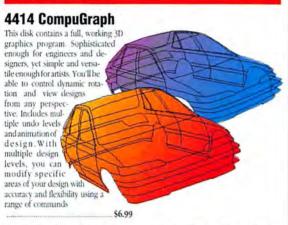
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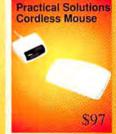
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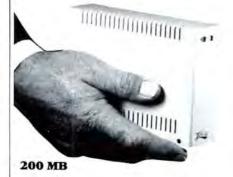
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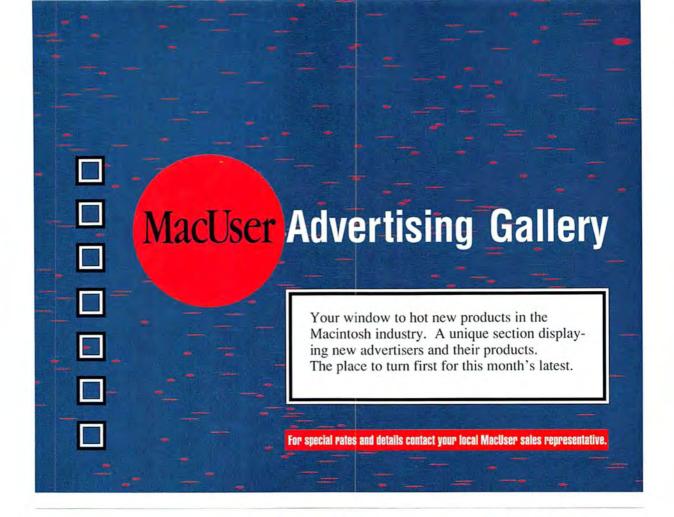
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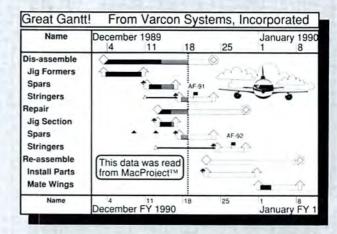
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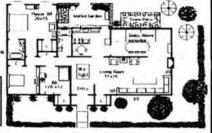
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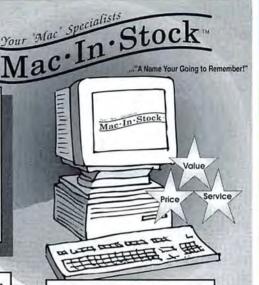
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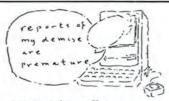
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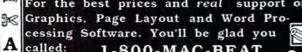
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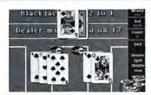
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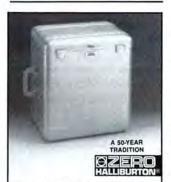
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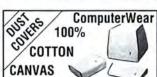


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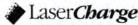
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t's not often I get to talk to the elusive Buffalo Chip, Apple maven and hacker extraordinaire. Buffalo contacted me over MCI mail to tell me he had something to say, but he could only tell me in a public forum where he felt safe. To him this meant the CompuServe CB system, where chaos seems to be the rule. Buffalo said that I couldn't quote him, but that I could capture the screens and reproduce them. So I captured this conversation, which told of Apple's future plans for the Mac.

Secrets of a Mad Hacker

CAPTURE ON

(A1-267, Spike) gotta go sleep off this cold (A1-127, MacUser) Hey is Buffalo Chip here? (A1-30, *Humble Heart*) CAb, join the club! (A1-267, Spike) nite all

(A1-46, RAMBONE) Any cute guys here?

(A1-71, Buffalo Chip) Dvorak, I have to make this quick.

(A1-71, Buffalo Chip) Are you capturing this? Don't try to figure out who I am.

(A1-127, MacUser) Don't worry. I'm not interested in who you are.

Job: 71Node: SCS

Handle: Buffalo Chip [68040,666]

Birth: 9/11/51 38

From: Silicon Valley, CA Using: not at the moment

Occupation: hacker

Interests: Apple, Sun, DEC, IBM, girls

(A1-71, Buffalo Chip) Apple is going to switch to RISC in 1991 or 1992 if theings don't work. It's going to be the Mac III. (A1-127, MacUser) I thought they made a public annpuncmeent to the contrary about RISC. (A1-71, Buffalo Chip) It's a bluff to get Motorola off their back so they could look at MIPS and SPARC. They may also use their (A1-71, Buffalo Chip) CRAY XMP to design a proprietary chip. THAT's the future. (A1-71, Buffalo Chip) I've heard that Steve Jobs is designing a chip too. With RISC the tools are available to make (A1-71, Buffalo Chip) proprietary chips. (A1-186, JETHRO BENZINE) just call me jb it's

a gas!

(A1-172, *War Eagle*) are you THE John C.

Dvorak?

(A1-30, *Humble Heart*) who is that? (A1-188, *Dark Knight*) A Mac dork, methinks. /send 71 Maybe we should do this in private?

... sending (A1-71, Buffalo Chip) Don't page me. My system is only secure if~/ (A1-152, *Black Strudel*) Hello (A1-188, *Dark Knight*) have someone get on this right away (A1-127, MacUser) Still there?

```
Job User ID Nod Ch/Gr Handle
    61141,101 SRC
                     34
                         Dumb Bunny
    67756,1056 TOM
                     26
                         Miss California (DD)
3
    61541,1346 SCC
                          Ruby
                     1
    62665,1525 FYN
                     33
                          Tri Man
    66066, 2252 DWC
                     G
                          S&M Slavegirl
    63160,636 CVT
                     24
                         Cafe Au Late
9
    60036,1405 LEX
                          KY Fried Deb
                     1
10
    66602,624
               OFI
                     G
                          *The Schozz*
    63136,3413 LOM
13
                          *Geezer*
                     G
14
    61260,423 HON
                     10 John Sculley
15
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    63366,3620 QFI
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                          Steve "Ross" Jobs
    61341,1651 LAX
                     22
                         Jeni
    62305,167 MIP
                     10
                         Prince
71
    64444,12
               OKC
                     1
                          Dull Witted Nerd
127 68070,20
               SFN
```

% Job 204 [63727,1350] This is a different ID, but I assure you it's me. They're out to get me. Apple is paranoid about its secrets. (Al-127, MacUser) So what else should I know? (A1-140, VALDAR) restrain thyself lest you fell my wrath! (A1-179, FrenchMaid-slave tv) fell one's

(A1-121, deedee (phD)) Ohhhhh. A Tough guy! (A1-204, *TOUGH GUY*) Complete corporate

reorganization. Stem to stern (A1-140, VALDAR) stem to sterno (hic)

(A1-127, MacUser) What about Gassee and the

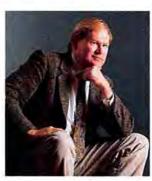
others? Any news? (A1-204, *TOUGH GUY*) Dunno, but there will be a big emphasis on multi-media and a new

architecture. All new in 1991. Look for (A1-204, *TOUGH GUY*) a huge rollout like the

old days. Maybe in January. The key is numerology.

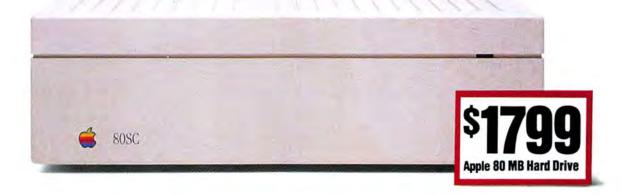
(A1-127, MacUser) Numerology? (A1-204, *TOUGH GUY*) Take the values of the word RISC A=1, Z=26 and everything is in-between RISC=18+9+19+3 you add them and get (A1-204, *TOUGH GUY*) 49. 4 plus 9 equals 13 and one plus three equals 4. It will be on a Mac III. 3+4=7! Get it! System 7!

It was then that I knew he was crazy.



By John C. Dvorak

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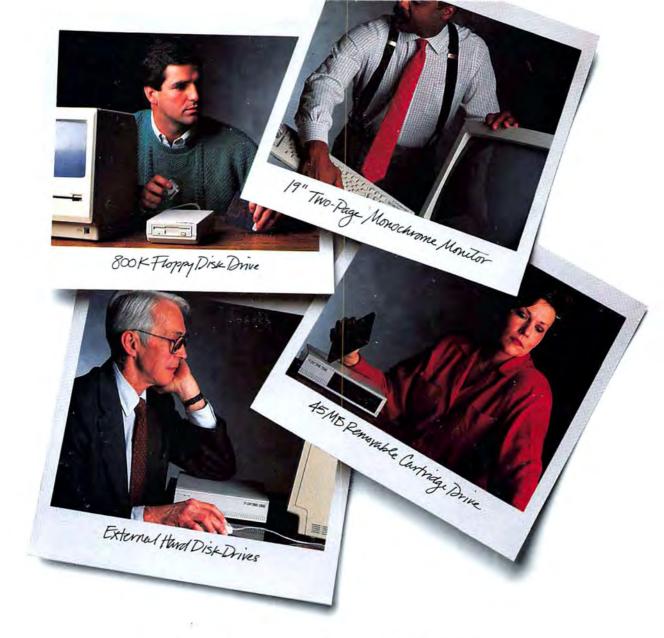
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